

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

3.6 L. C. Transfer

1917

RECEIVED
MAY 6 1917
Department of Agriculture

SCOTT'S 'FIELD' SEEDS

Selected and Cleaned to
be free from Weed Seeds,
Dead and Immature Grains.

O.M. SCOTT & SONS CO.
MARYSVILLE, OHIO.

SCOTT'S FIELD SEEDS

*Selected and Cleaned to be
Free from Weed Seeds,
Dead and Immature Grains.*



O. M. SCOTT & SONS CO.
MARYSVILLE, OHIO

Contents

	Pages
Introduction	3-8
How to Know Good Seed	9-11
Scott's Seeds	12-13
Alfalfa	14-27
Seed Bed-Poor Seed-Lack of Fertility-Fertilizers-Acid Land-Drainage-Inoculation-Winter Killing-Nurse Crop-Seeding-Harvesting-Pasturing-Cultivation-Rotation-Turkestan Alfalfa-Grimm-Cossack-Liscomb-South Dakota 12.	
Sweet Clover	28-31
A Land Builder-For Pasture-For Hay-Rotation-Seeding-Scarifying-Seed Production-Summary.	
Red Clover	32-33
Mammoth	34-35
Alsike	36
Crimson Clover	37
White Clover	38
Japan or Lespedeza.....	39
Vetch	39
Soy Beans	40-45
Seeding-Harvesting-Inoculation-Ohio 9035-Early Brown-Ito San-Medium Green-Holly Brook-Roosevelt-Medium Yellow-Mikado-Wilson-Ebony-Mammoth Yellow.	
Canadian Field Peas	46
Cow Peas.....	47
Timothy	48
Timothy and Alsike.....	48
Grass Mixtures.....	49
Pasture Mixtures.....	50
Meadow Mixtures	51
Grasses.....	52-55
Kentucky Blue Grass-Orchard Grass-Redtop-Meadow Fescue-Brome Grass-Tall Meadow Oat Grass-Rye Grass-Miscellaneous Grasses-Millet-Sudan Grass-Dwarf Essex Rape.	
Corn.....	56-57
Clarage Corn.....	58-59
History-Little Clarage-Improved Clarage-110 Day White-Reid's Yellow Dent-120 Day Yellow-White Cap-Ensilage Corn-Stowell's Evergreen Sweet Corn.	
Wheat	59
Oats	60
Rye.....	60
Barley	60
Beardless Barley.....	60
Lawn and Golf Course Seed.....	61
Legume Bacteria	61
Points about Ordering.....	62-64

JAN 18 1917

Transferred from the Library

of Congress under Sec. 259

Copyright Act of March 4, 1909

Copyright 1917 by

M. SCOTT & SONS CO

Marysville, O.

©CL.A456023

Introduction

FORTY years ago Mr. O. M. Scott, now in his eightieth year, bought clover seed just as it came from the huller, paying the same price for all lots, no matter how much weed seeds or waste matter they contained. The seed was either shipped to market or sold to the farmer in the same condition as received at the elevator.

This was the common practice. No matter what it contained Clover Seed was Clover Seed. Unfortunately some folks still think that anything harvested from a clover field is Clover Seed. But is it? Might not much of the Clover Seed that is sowed be called buckhorn, or foxtail, or even dead grains? This query applies just as well to grass seeds, especially such light-weight seeds as orchard grass, blue grass, and red top.

Wonderful changes have come about in forty years. We have all come to realize that the foundation of our prosperity is in the prosperity of the farm. Every possible thing is being done by State Experiment Stations and the Department of Agriculture to make the production of our farms offset the rapid increase in land values; and one of the first things learned was that highest production cannot be obtained unless PURE SEEDS are sown.

When we began selling seed by mail ten years ago, (for 40 years we have sold it locally), we had two definite purposes. The first was to sell nothing but field seeds. We are stronger than ever in this determination. We have seen too many men who started with the expectation of supplying a superior quality of field seeds, and who failed because they were carried away by the larger profits in garden and flower seeds and ceased to give all their time to the one thing.

It takes personal attention and nerve to sell PURE field seeds because they are becoming harder instead of easier to find.

Our other purpose was to furnish better field seeds than any one else,—seeds free from weeds as well as from small, immature and dead grains.

As an indication of our success in following this policy, we are supplying today a large number of experiment stations, possibly more than any other seedsman. Ask your own station about us, or, if you are fortunate enough to have one, ask your county agent.

We have always used and expect always to use that extra care with our seeds which will put them in a class by themselves, so that when our friends purchase Scott's Seeds they will know that they are getting the very best seed obtainable.

Even last season, when there was very little seed of any kind that was not full of weeds, we did not sacrifice quality to expediency. We sacrificed profits instead. It is a satisfaction to us to be able to say that all through the season we supplied seed that was absolutely free from buckhorn.

We cannot but feel that in this we stand alone, for a month before sowing time was over, we could not locate in any market red clover that was free from buckhorn and other weeds, most of the red clover then for sale being imported.

We try to supply seeds free from weeds for the reason that we believe there is a place for a seedsman who is willing to give all his time to an effort of this kind. There is little chance for permanent success in any business that is not built on quality, and especially is this true of the seed business. Certainly there is small satisfaction to be had from any endeavor to which anything but best efforts are given. In selling seeds best efforts can mean nothing but doing every thing to make larger yields possible.

Good yields cannot result from the sowing of weed seeds or of small, immature or dead grains. Weed seeds make weeds, immature grains make weak plants. Largest yields may be expected only when the field is entirely occupied by strong plants.

Every day we hear of instances where manufacturers making a standard article at an established price are obliged to put less value into the product because of the never-ending increase of material costs. This expedient may pay the manufacturer for it may be the only way he can live.

The farmer is not under this unhappy compulsion. The upward tendency of prices is an incentive to increased production. Assuredly, inferior seeds are not a means to this end.

The best and purest seeds and the most enlightened methods of cultivation, involving increased outlay as they may, are necessary to make increased profit for the farmer.

On the farm larger and more profitable crops are always raised by the man who is willing to put a little extra work on his ground and to use a little more care in purchasing seed.

The temptation to lower quality besets the seed business more than any other, for it is the extra 3 or 4 pounds of weed seeds or dead grains, or both, cleaned out, that take away all chance of profit, if the buyer has no interest in quality.

With Scott's Seeds, besides removing weed seeds and dead grains, we remove, just as far as is possible small immature grains, for, as Mr. F. H. Hillman, of the United States Department of Agriculture says in Farmers' Bulletin No. 382: "The presence of a large proportion of very small clover seed from any source is equivalent to adulteration, since the crop-producing power of small seed is known to be inferior to that of *well-filled seed*."

We remember quite well when buckhorn first became a pest and the very strong prejudice Mr. Scott had against this weed. Even then much of the clover seed was infected.

Any one who has had this weed on the farm, and knows its capacity for spreading will understand why it is now almost impossible to procure clover that is free from it.

Sow one grain of buckhorn and the next year you have dozens of little plants all round the spot.

Sow any weed and you will find the offspring in the field for all time to come.

Weed seeds that you sow with your field crop are much more likely to grow than the field crop itself.

The sower is not the only one who suffers from the planting of weedy seeds. Neighbors on all sides get their full share of weed seeds as soon as the weeds mature.

In Oregon a certain valley produces probably the most beautiful clover seed in the world but unfortunately the first man who successfully grew clover seed there sowed seed that was full of buckhorn. The neighbors, seeing the large crop and not being acquainted with buckhorn came to him for seed. There is scarcely need of telling the rest of the story.

Buckhorn soon covered the entire district. We have never seen a bushel of this seed that did not contain considerable buckhorn, and every farmer in this big, productive section gets a lower price for his seed because one man was careless.

Modern farming, the most important business in the world, cannot stand for wastefulness.

For one seed nature often gives a thousand per cent increase. If space that should be occupied by profit-paying plants is taken up by weeds there is loss instead of gain.

A single plant of mustard has been found to contain 10,000 seeds; buckhorn 15,000; pigweed 115,000; foxtail 113,000.

The State Grain Inspection Department of Minnesota gives the annual dockage on grain alone on account of weed seeds as about \$2,500,000.

European stations show losses of 30% and more of value on account of weeds.

The Iowa Experiment Station estimates the loss in Iowa on account of weeds at from five to seven million dollars annually. This estimate was made on the basis of an experiment showing a one-third larger crop on clean land.

Think what it would mean to add one-third to the production of your farm.

Undoubtedly it would take some years to get the fields clean enough to do this but a vast difference in yield can be seen the very first year if care is used to get seed that is free from weeds and from grains that will not grow.

In Bulletin No. 48, the Wisconsin Experiment Station says: "Some weeds are so noxious that if farmers knew their real character they would postpone all other business until they were destroyed."

Farm papers are full of inquiries asking how to get rid of weeds. Hardly an issue but contains letters telling of the years spent fighting patches of Canada Thistle, Crab Grass, Buckhorn, Sorrel, etc.

If the owner isn't a good fighter the patches spread, eventually the struggle is given up altogether and the farm is abandoned.

It is business suicide to sow weedy seed.

The Colorado Agricultural College says: "Many farmers are paying as much as a dollar per pound for the opportunity to plant on the farm several pounds of weed seed each year. Others do not pay as much for the opportunity to sow the seed but the work of eradicating these weeds costs them many hours of labor and no small amount of money."

The bulletin gives as an example two lots of alfalfa, one at \$12.00 per bushel and the other at \$9.60 per bushel. Sample No. 1 contained no weed seeds, chaff, nor dirt, the germination being 94%. Sample No. 2 contained 7% weed seeds, and 2% chaff and dirt, the germination being 80%. This illuminating comment is then made:

"If you buy 100 pounds of No. 1 you get 94 pounds of seed that will grow, at a cost of \$20, or a cost of \$21.28 for 100 pounds of perfect seed.

"For No. 2 you pay \$16.00 for 71 pounds of perfect seed or \$22.54 for 100 pounds of perfect seed.

"In the above case you pay \$1.26 for the privilege of planting seven pounds of weed seed on your farm. Even greater variations than the above can be given. Every man should know how good the seed is that he is planting."

There is no danger at all of paying for weed seeds if our simple test given on another page is used.

Careless persons often make the statement that it does not pay to sow pure seed for the reason that the ground is already full of weeds. But if a proper rotation is followed a farm may be kept practically free from weeds. Weeds must not be allowed to go to seed and weedy seed must never be sowed.

Maryland State Bulletin No. 9 says: "The question of pure seed is a very important one in weed control. There is scarcely any agricultural question of more vital importance than the question of good seed; none in which slighter differences can have greater influence on the result; none in which there is greater opportunity for fraud.

Nearly all our bad weeds have been introduced in seeds of various crops, especially in grass and clover seed. Weeds are being carried every year to new localities in this way. One

must be constantly on the lookout, and no seed should be sown without a careful examination for weed seeds.

Every farmer wants to be sure whether the seed he is planting is the variety or strain he wants and whether it has sufficient vigor to make healthy plants, that is, whether it will germinate properly and whether it carries any infectious disease. He also wishes to know whether it is adulterated with weeds or other plants not desired."

The section of this catalogue "How to know Good Seed," explains how you can avoid being deceived in quality. It also explains just how you may "know whether it is adulterated with weeds or other plants not desired."

In Bulletin No. 170 the Vermont Station says of the weed situation: "This trouble is especially acute in Vermont where whole mountainside pastures have been thus destroyed."

Bulletin No. 660 of the United States Department of Agriculture, says: "In a sense farming might be called a warfare against weeds. Some farmers emerge from the struggle victorious, while others go down to defeat. So powerful are weed enemies in reducing crop yields, while at the same time multiplying labor, that the farmer should at every turn strengthen his position against them. He should bear these invaders in mind in planning crops he will grow and in deciding on the fields where he will grow these crops, in choosing the implements he will use, IN BUYING HIS SEED,—far more important than to kill weeds is to avoid having weeds to kill."

We believe that we are doing much to assist in this warfare. Besides furnishing seeds as nearly perfect in purity and germination as seed can be we are doing all we can to inform the purchaser so that he can tell just what he is getting. Of course we wouldn't do this if we did not know that Scott's Seeds will stand any test to which they may be put.

The seed that I got from you last year was good clean seed, free from weeds and foul stuff. That is why I ordered of you this year and this seed is nice. Have tested it and think every seed sprouted.

Robert Welch, Greenwich, Ohio.

Seeds arrived all right, and look just as good as other lots I have gotten from you. I have bought seed several places but yours is the best I have ever planted.

Geo. W. Gibson, Pt. Marion, Pa.

How to Know Good Seed

FROM Department of Agriculture Farmers' Bulletin No. 660, "Weeds; How to Control Them."

"First, the farmer *should know what constitutes good seed*; second, he should know fairly closely what high-grade seed is worth; and, third, he should be willing to pay a fair price for it. Laxity on one or more of these points is responsible for most of the farmer's trouble over poor seeds. . . . Cheap seeds are really the most expensive kind that can be purchased."

From Department of Agriculture Farmers' Bulletin No. 428, "Testing Farm Seeds in the Home and in the Rural School."

"In the matter of seed buying *the best protection* to the purchaser is believed to be *self-protection* based on the ability to judge the quality of the seed offered."

We have always maintained that the buyer should be able to judge seed for himself. While it would take some time to become an expert, yet, in a very few minutes, one can easily tell which of several samples is the most economical and the safest to sow.

For years we have been urging buyers to use our test. Here it is: Spread the sample on a piece of white paper and pick out and scrape to one side all waste matter, that is, weed and foreign seeds, blasted and immature grains, chaff, etc. Then compare the two piles, noting particularly the weed seeds in the waste pile. This simple operation gives an excellent idea of the worth of the seed and readily shows the comparative value of samples from different dealers as far as purity is concerned.

To make a germination test, remix the seed and count out, say, 200 seeds. Be sure to take them just as they come and do not choose the best grains for the object is to find out what percentage of the total seed will grow. The seed may be planted in a box of dirt or sand kept moist, or may be put between two blotters or strips of cotton flannel, placed on a plate covered with another plate upside down. This prevents evaporation. Keep the blotters moist but not in water and as near the temperature of 70 degrees as possible. Examine the seeds each day and see how they are germinating. Weak or slow germination indicates that the seed will make weak

plants. Sprouted seeds may be removed each day if desired. Some seeds require a longer time to germinate than others.

The proper germination periods are as follows:

Clover seed between three and six days.

Timothy and Red Top between five and eight days.

Orchard Grass between six and fourteen days.

Kentucky Blue Grass fourteen to twenty days.

By estimating the percentage of pure seed, (the exact percentage can be found only by using weights), and multiplying this percentage by the percentage that germinates, marking in decimals and dividing the market price by this result you get the approximate cost of one bushel of absolutely pure seed every grain of which will germinate.

Seed costing \$10 per bushel with a purity test of 99½% and a germination test of 94% costs \$10.69 per bushel for perfect seed.

Seed costing \$10 per bushel with a purity test of 99½% and a germination test of 80% on account of dead grains shows an actual cost of \$12.56 per bushel.

Seed costing \$10 per bushel with a purity test of 98% caused by weed seeds and other waste matter and a germination test of 80% shows an actual cost of \$12.75 per bushel. This third lot is about the same as lot two in actual value of perfect seed but is worth many dollars per bushel less on account of weed seeds.

If you want to go into the matter of seed testing a little more thoroughly send for Farmers' Bulletin No. 428, from which much valuable information can be obtained.

The accepted system of making purity tests seems to be the only practical one, but a person not familiar with it is quite likely to be deceived. You would naturally suppose that 99% pure meant that 99% of the seed would be good, plump, healthy grains. But this is not the case as is shown in the following letter. We asked about clover seed; the same test is used on other seeds.

Washington, D. C., Aug. 30, 1916.

O. M. Scott & Sons Co., Marysville, O.

Gentlemen:—Replying to your inquiry of August 15th, I would say that it is the practice of this laboratory to consider all clover seeds as pure seeds in clover seed tests whether they are shriveled or not and all parts of seeds larger than one-half as pure seeds. Broken pieces smaller than one-half are considered as inert matter. This is also the practice recommended by the Association of Official Seed Analysts of North America.

Yours very truly,

E. BROWN, Botanist in Charge.

In making a purity test seed analysts classify impurities as follows:

Inert matter, including broken seeds, dirt, stone, sticks, chaff, and other similar materials.

Foreign seed, including all seeds except those of the kind being examined.

We call particular attention to the fact that no mention is made of dead grains, not even those that are so badly shriveled that any one can tell there is no life in them. It is left to the germination test to show the actual value of the seed.

Seed may contain 25% or even more of these worthless grains and still test 99% pure.

Above all things, test the seed yourself or have it tested. Results are often surprising. When in doubt which seed to buy send a sample to Washington or to your State Experiment Station for a purity test. If it is impractical to wait for a germination test also, do not rely upon the purity test alone, but use our test in judging the amount of dead grains the sample contains.

Remember, however, that blasted grains are not of as much importance in the long run as weed seeds. The very brightest and plumpest seed testing 99½% pure may contain enough weed seeds of a noxious variety to cause one to be sowed on each square foot of the field.

The Farmers' Bulletin last quoted (No. 428) says: "The fact that seed of the principal forage crops in which both the purity and the viability closely approach 100% does appear on the market justifies one in assuming that all seed of these crops sold as high-grade should possess equally good quality."

This is the sort of seed that we are trying to furnish. By testing samples as suggested in the foregoing, you can judge for yourself how we are succeeding.

Test us by our seeds.

"The seed I got from you last year did fine. Might be some as good, but none better. You have likely heard from farmers whose names I sent you before."

F. Montague, Somerfield, Pa.

"The seed I ordered this spring gave perfect satisfaction."

Floyd L. Wensel, Oakland, Md.

"The seed shipped me last year was very fine and by ordering early I expect as good again this year."

R. H. Stradley, Wellsboro, Pa., R. No. 1

Scott's Seeds

THOUSANDS of bushels of poor seed are harvested to one bushel that can be sold as WEEDLESS seed, so it is easy to see the importance of selection in any field seed business where quality is desired.

Machinery will take out a large proportion of the weeds, but if there are mature weeds in the field at harvest time, some weed seeds will remain in spite of the most careful cleaning.

Buckhorn, Dodder, Foxtail, Russian Thistle, etc., cannot be entirely eliminated from Red Clover, Mammoth and Alfalfa; nor can Buckhorn, Sorrel, Peppergrass, Dodder, Black Plaintain, or Canada Thistle be all removed from Alsike Clover and Timothy.

Blue Grass, Red Top, Orchard Grass, and other light-weight seeds, if grown in weedy fields, are cleaned with even poorer success.

To furnish field seed free from weeds, we must know where seed is grown that will clean properly.

As certain soil and climatic conditions favor particular trees, so certain localities produce the best field seeds of a given variety. The favorable locality may be small, even a single county in a large producing area, and often varies with the season.

A few square miles may produce the only good seed in the United States. This was true last year in the case of red clover, and almost true of alfalfa as well.

Scott's seeds will help to rid your farm of weeds for two reasons: First, they have been carefully selected; second, they have been thoroughly cleaned. Our samples will convince you of their superiority.

There remains the question of price.

The prudent buyer is always watchful lest he pay too dear for his supplies, and is equally on his guard against buying too cheap, his first thought being of quality. Therefore, in buying seeds he does not allow the desire for cheapness to be his motive. He knows that the argument of price is addressed to the man who is too careless to plan for the future, who does not remember that present saving by sowing cheap seeds

means future loss compounded every year by the growth of noxious weeds.

Field seeds, like other commodities, are bought and sold on the basis of market quotations, so there can be little difference in prices wherever purchased, grades being equal.

No one seller of seeds can have much advantage over another. In view of this it would seem that the buyer is sure to get whatever he pays for no matter where he purchases a bushel of clover seed, whether it cost eight, ten, or twelve dollars per bushel. While it can be said of other commodities that you get just what you pay for, it is not always the case when buying field seed.

A pound of fifteen cent coffee is worth about fifteen cents; twenty-five cent coffee is worth about twenty-five cents.

But when the market price of good clover seed is twelve dollars, you get less than ten dollars in value if you buy ten dollar seed. The viable clover seeds in the bushel might be worth ten dollars if by themselves, but a large part of this value is destroyed by the impurities that are to be found in this kind of a bargain. Along with your good seed you are sure to get several pounds of dead grains, and, ninety-nine times out of a hundred, you buy trouble for years to come from WEEDS.

Strenuous competition and wide-spread market information make it impossible for any dealer to sell pure seed at the price of poor seed.

If prices are low quality must be low.

We claim to have this advantage in quoting prices: We are, so far as we know, the only seedsmen dealing in field seeds alone. This enables us to watch the markets closely and to buy in large quantities at favorable times.

The only way we can cash in on this advantage is to make it to your interest to buy of us.

"I received grass and clover seed O. K. and am thoroughly pleased.

I guess I am a crank on the grass seed question but think I am fully justified in the stand I take.

I don't think there is a weed seed in all the timothy I bought and the finest I ever saw all the way through."

F. O. Blake, Central Station, W. Va.

Alfalfa

ALFALFA is one of the oldest of cultivated plants, and is undoubtedly, a native of central Asia. During the Persian War, about 500 B. C., it was brought to Greece. Later it was carried to Rome, from there to North Africa, and thence to Spain. From Spain it was introduced into Mexico and from there into South America, working its way from Chile to Southern California, and to all parts of the United States. Gibbon's *Decline and Fall of the Roman Empire* mentions the introduction of Alfalfa into Italy from Persia by the Romans. The Roman farmers gave it credit for more than doubling the productivity of the land by enhancing the fertility of the soil and increasing the number of cattle. The word "alfalfa" seems to be a Spanish form of an Arabic word "alfacafacah," meaning "THE grass," or "the best fodder."

Considering the time that alfalfa has held an important place in agriculture, and the many men who are devoting their time to the study of the plant, it seems that more definite knowledge as to varieties might be available, but the authorities disagree as to the origin and the desirability of different strains. Especially noticeable is the contradiction apparent in results of experiments made to compare so-called strains of the ordinary American alfalfa grown in various parts of the United States.

For a number of years Montana and Dakota seed have commanded a price per bushel two or three dollars higher than Kansas seed, it being asserted by growers in the two former states that seed grown so much farther north would more surely withstand winter-killing. We have for several years sowed seed from various localities, some having been grown as close to the equator as Peru and some as far north as Montana. Though the seed came from such widely separated localities we have found no perceptible difference in hardiness as far as origin is concerned, as all our alfalfa winter-killed during the extraordinarily severe weather five years ago, the only exception being the Grimm.

Consequently we do not pretend to know a thing about the comparative hardiness of alfalfa, but we do know that the sale of any article is dependent to a considerable extent upon

the kind of advertising there is behind it, and that there must be some talking point to hammer away on. The northern alfalfa growers are certainly good advertisers and in the seed business "Northern Grown" is a name to conjure with, even though it may denote a merely fancied excellence.

We believe that as soon as alfalfa becomes generally used farmers will pay no more attention to latitude in buying alfalfa seed than they now do in buying red clover. Some of the hardiest alfalfa brought to this country by Prof. Hansen was grown in the cotton-growing section of Turkestan.

Alfalfa seed is not raised much farther north than Wisconsin, so that State is the ideal place for testing seed from all sections of the country. Tests made last year are especially significant as the winter was a severe one.

The Alfalfa Order of Wisconsin was organized in 1911, and has a very large membership. We quote from a letter of October 12, 1916, received from the Secretary, Prof. L. F. Graber of the Wisconsin Experiment Station.

"Your letter of the 7th received and I note that you are interested in our work on the winter-killing of alfalfa produced from southern and northern grown seed. By southern grown seed we have reference to seed produced in Kansas, Nebraska and Oklahoma. Our tests so far have only included southern seed from these states. We are not yet ready to give any information on seed produced in New Mexico and Arizona or Southern California."

"For a long time it has been the general belief that the only seed adapted to our conditions was that produced in the northern states such as the Dakotas and Montana, the latter having the preference. As a result of this the northern grown seeds have been sold for three to four dollars a bushel more than seed of equal quality produced in Kansas and Nebraska."

"In order to test out this matter we have had the members of our State Alfalfa Growers Association—the Alfalfa Order—try out the different strains of alfalfa and much to their surprise (as they had much prejudice against Kansas seed) they found that the Kansas and Nebraska seed grew to be equal in every respect to the Dakota and Montana strains. Their experience has been identical with ours here at the Experiment Station Farm. Last winter was a very severe one in this State and resulted in much damage to alfalfa and clover fields throughout the southern part of Wisconsin. This gave all strains of seed a severe test which makes the data we have gathered quite conclusive. We have every reason to believe that Kansas grown seed and Nebraska grown seed are just as satisfactory for Wisconsin conditions as seed produced further north."

"The matter of hardiness in alfalfa is not so much a proposition of where the seed is grown or how old the field is, it is more particularly a matter of the strain or variety of alfalfa."

H. L. Westover of the United States Department of Agriculture, in a letter dated November 22, 1916, says:

"In our work at the Federal Station at Redfield, South Dakota, during the past three years we have noted but little difference between South Dakota and Montana seed. Kansas seed, however, has been quite perceptibly less hardy than Nebraska, and the South Dakota and Montana seed have both proven hardier than Nebraska. In general, our experience has been that the seed grown in Montana and the Dakotas is hardier than that grown farther south. In favorable winters, it frequently happens that none of these strains suffer any great amount of winter-killing, even in the Northern States. The real test of hardiness comes in rather severe winters and then we nearly always find that the northern-grown seed will come through the winter better than that grown as far south as Kansas."

But Mr. M. Champlin of the South Dakota Experiment Station in a letter of November 8, 1916, says:

"In reply to your letter of November 4th, I regret to state that we have made no definite tests of the comparative hardiness of South Dakota, Montana, Kansas, Idaho and Nebraska grown seed. In connection with our variety tests, we have observed, however, there has not been a very great difference in hardiness between the Kansas non-irrigated, Montana and South Dakota grown seed."

It seems unfortunate that the available information on this point is not more definite, but as many of the agricultural colleges and experiment stations are now going into the matter thoroughly we hope next year to give more conclusive reports. In the meantime we shall continue to favor Kansas seed as we have in the past. We believe that we are entirely justified in our long continued policy of favoring Kansas seed, for the reason that Kansas furnishes ideal conditions for growing alfalfa. These conditions result in close stands and a minimum of weeds. In no other place can we find seed as pure. As we wish to sell weedless seed, our preference is naturally for the locality where cleanest seed is to be found.

If seed is to be sown for hardiness the more expensive Grimm had better be used, rather than to buy seed of doubtful origin and worth, at a fancy price. If extra care is used in preparation of seed bed and seeding, the sower can economize by using a smaller quantity per acre. But there is little foundation for the statement made by some growers of Grimm seed, that it requires a considerable less amount per acre.

Early frosts in the fall of 1916, ruined much of the alfalfa seed, and thousands of bushels of seed contain a large percentage of dark worthless grains. We thought it necessary to go to the alfalfa districts personally this year to select the kind of seed we wanted from growers. We found the conditions worse than we expected, but purchased in Kansas over 2,000 bushels that met our idea of what good seed should be. But many times this amount had to be rejected. Most of it was purchased in the northern tier of counties.

We had expected to go to South Dakota and Montana for a carload, but most of the samples we received indicated an unusual injury from frost in Montana and, as the season was somewhat unfavorable in South Dakota, probably 90% of our samples containing considerable Russian Thistle, Fox Tail and Pig Weed, it seemed to be too difficult an undertaking to find in one locality a full car of good seed. So, in these states we have purchased lots here and there that are free from weeds and will clean up free from dead grains.

As might be expected, giving heed to the demands of our trade, we have large stocks of seed grown in Montana and South Dakota.

Why Alfalfa Sometimes Fails

Although there is still much to learn about alfalfa, it is, of course, no more difficult to make an alfalfa seed sprout than it is to make any other kind of clover seed sprout. The needful thing is to provide conditions favorable for its growth throughout the several years it may occupy the ground. One can afford to go to more trouble in preparing the ground for alfalfa than for red clover which lasts but two years.

Alfalfa can be produced on almost any kind of soil. Failure is more often due to incomplete preparation of the ground than to type of soil.

The Michigan Experiment Station compiled the following table from reports of 701 seedings, representing 4,065 acres. The table is purposed to show the principal causes of poor results or failures in seeding alfalfa.

Poor preparation of seed bed.....	34.4%
Lack of inoculation.....	30.6%
Winter-killing.....	12.4%
Weeds.....	9.7%
Light, infertile soil.....	5.9%
Seeding with nurse crop.....	4.3%
Insufficient drainage.....	2.7%

Preparation of Seed Bed

It is not possible to plow timothy or blue grass sod for immediate planting of alfalfa, without having the growth of alfalfa greatly interfered with by grass. A cultivated crop, such as corn should be raised the year before; then it is unnecessary to plow the ground unless it is foul or of a very heavy character.

If plowing is thought best it should be done in the fall, especially if early spring seeding is contemplated, for in seeding alfalfa the loose, open seed bed, such as is prepared in plowing a short time before seeding, should be avoided. It takes nearly six weeks for plowed ground to settle for alfalfa seeding. Otherwise, capillarity, or the power of the soil to draw the water to the surface, is interfered with.

The surface should be cultivated until the soil is as fine as a well-prepared garden. The top covering prevents evaporation, and thus keeps the soil warm, besides leaving the seed in complete contact with the soil, which makes plant food easily available when the seed sprouts.

The young plants are likely to die in poorly prepared spots, these eventually becoming weed distributing stations. Hollows become filled with water and ice, which may kill the alfalfa.

Competition of Weeds. Poor Seed

The ground always contains weed seeds, for this reason thorough cultivation at intervals to kill them as they sprout is advisable. After going to this trouble it is surely unwise to sow seed that contains weed seeds that will sprout at the same time as the alfalfa and probably overcome it.

Lack of Fertility

While alfalfa is a deep feeder, drawing its foods from greater depths than most plants, it is more tender than other clovers when young, and needs encouragement. Well rotted manure is the best fertilizer, but usually not available. Fresh manure on account of weed seeds should be applied to the preceding crop, or before plowing, the weeds being destroyed by frequent cultivation up to seeding time. Green manure crops supply humus so necessary to alfalfa, but are likely to cause an acid condition of the soil.

Fertilizers

If it is impossible to use either of the above, commercial fertilizers should be used, especially on poor soils. We like bone meal best. Any fertilizer used should contain a large amount of phosphorous and some potash. Alfalfa gathers its own nitrogen. Different sections and different soils require different fertilizers. Ask your experiment station which is best to use on your farm.

Acid Land. Need of Lime.

The percentage of lime in the ash of alfalfa is almost 35, nearly twice the percentage shown by red clover, and more than 7 times that in timothy. Lime is beneficial to most plants and to the legumes it is absolutely necessary. Much more lime is needed for alfalfa than for red clover.

If sorrel, dock, red top, or blackberry bushes thrive in your fields and clover does not, undoubtedly lime is needed. If muriatic acid poured on the soil fails to make bubbles, lime should be used. If limestone pebbles or shells are present lime need not be added. The absence of these, usually though not always indicates the absence of lime. Valleys are not so apt to require lime as hills.

When in doubt about lime, use it or consult your station.

A large crop of alfalfa cannot be expected unless the bacteria which find their home in the nodules on the roots are present. These bacteria gather free nitrogen from the air, and pass it on to the alfalfa, but they have no use for an acid soil.

Of the three forms of lime, the one that is the most economical in your section should be used.

One hundred pounds of raw lime rock when burned is reduced to 56 lbs. of burnt lime or quick lime. When this is water-slaked it takes up 18 lbs. of water, making 74 lbs. of hydrated lime. Therefore 56 lbs. of burnt lime or 74 lbs. of hydrated lime is equivalent to 100 lbs. of ground lime stone.

Probably not less than two tons of ground limestone per acre should be applied and more will not hurt. Apply as long before sowing as possible, even a year in advance.

Please quote me price on 20 lbs. Kansas Alfalfa Seed. Also on small quantities of Crimson Clover and Vetch Seed. Am doing some experimenting on my farm and Prof. H. A. Morgan of the Experiment Station, Knoxville, recommended your seeds.

O. P. Johnson, Etowah, Tenn.

Drainage

All plants require air in contact with the roots. If there is too much water in the soil, the air is reduced, and root development retarded. A lesser top growth follows. Drainage takes off surplus water and admits air, causing circulation. Many soils do not need tile at all. Almost any wet soil, if properly drained, will raise alfalfa. The tile should be put in as deep as may be practicable.

Inoculation

A great many scientists have been giving years of study to the subject of inoculation. As far as we know every one of them agrees that it is necessary to introduce the proper bacteria into the soil if the best stand of alfalfa is expected. The cost for either time or material is small, so it scarcely pays to run the risk of partial or complete failure in order to save the trouble. One method of inoculating is the scattering over the new field of soil taken from an old alfalfa or sweet clover field that is known to be inoculated. Two or three hundred pounds of soil per acre should be used. Sow in the evening or on a cloudy day and harrow in immediately. Another method is the use of commercial cultures. Most of them are thoroughly reliable. The kind we have we guarantee to produce nodules. One advantage they have over soil from an old field is that with the cultures there is no danger of introducing noxious weeds. Nitrogen is the most expensive fertilizing element. If the bacteria are supplied alfalfa fills the soil with it at no cost.

Winter-Killing

Alfalfa seldom winter-kills on land well-drained. Any clover is apt to winter-kill if there is little humus in the soil. Ground containing plenty of humus is porous and ventilated; there are air spaces which favor the rapid carrying-off of excess moisture. Stiff clay soils that are devoid of humus become filled with water which in freezing weather forms ice and causes the soil to expand and heave, pulling out and breaking off the roots. Fields that carry red clover through the winter will do the same for alfalfa. If each year it is becoming harder to keep a stand of clover, put humus in the soil. Soils that contain humus are warmer than soils that do not.

Nurse Crop

Coburn and Westgate say that when a nurse crop is sowed alfalfa usually succeeds in spite of the nurse crop, rather than because of it. Most authorities agree with this statement. When young, alfalfa needs the sunlight, and all the moisture and fertility, especially in a dry season. In the spring on very fertile land that is well adapted to alfalfa a nurse crop may be used to keep down weeds; this may be a half sowing of oats, barley, rye or winter wheat, to be cut for hay. Clipping to keep back the weeds may prove as satisfactory, for a growth of grain that is heavy enough to smother weeds, would necessarily keep back the young alfalfa plants, which at first are much weaker than weeds.

Seeding

Alfalfa may be successfully seeded at any time from early spring until late summer. Many prefer early seeding with a nurse crop of beardless barley or oats or rye, to keep down weeds.

Some sow in June, but we have found that foxtail, and other weeds are still likely at that time to be a serious menace, and, because we don't like weeds, we prefer to sow from July 20th to August 20th. This gives plenty of time for getting the ground in fine shape and killing the weeds by cultivation. At this time the young plants receive full benefit of moisture, sunlight and plant food, as they sprout. Late seeding is especially desirable on thin lands, otherwise, weeds are sure to cause trouble.

Fertile ground does not require as much seed as poor ground. Poor seed will not go as far as good seed. Broadcasting requires more seed than drilling. Thus the amount required per acre varies, but as a general rule fifteen pounds per acre will be found about the right amount. After sowing harrow lightly to cover seed and smooth out any furrows left by the drill. Alfalfa seed should never be covered to a greater depth than one-inch. The top should be left loose.

Please ship seed at once as I am ready to sow. Was highly pleased with the seed that I bought from you last year. Alfalfa is a fine set. Think every seed came up.

J. W. M. Witten, Abingdon, Va.

Harvesting

Alfalfa leaves contain twice as much protein as the stems. This should be kept in mind when the hay is being made, and every means used to save the leaves.

The Kansas Experiment Station found that the protein content of alfalfa when one-tenth in bloom is 18.5%, when in full bloom, 14.4%. For this reason the mature hay is better for horses. Providing new shoots have started the best time to cut is just as the field begins to show blooms. There should be an abundance of shoots about $1\frac{1}{2}$ inches long. If too long they will be clipped by the mower and growing time will be lost, for alfalfa grows from the end of the shoot like a fern. Growing time is lost and a diminished yield results if the crop is cut too soon.

The basal sprouts are the best guide to cutting, but in dry seasons the new shoots are sometimes slow in appearing. In this case the blooms must be taken as the sole guide, for the feeding value diminishes rapidly as leaves are shed to protect the plant from the drought.

If the hay is allowed to dry too rapidly this loss of leaves happens during the curing process. But a little experience however soon demonstrates that alfalfa is easily cured.

Alfalfa may be put in the stack or mow damper than is generally supposed, that is while the stems are still quite tough or flexible.

Alfalfa should be let lie until the leaves are wilted then raked into windrows and then into cocks, until cured. A very heavy crop may be tedded;—Alfalfa may be stacked when so dry that moisture cannot be wrung out by twisting the hay.

Any kind of hay should be exposed to the hot sun as little as possible while curing. Too long exposure bleaches the leaves of alfalfa, and causes them to become brittle and fall off. Curing through the action of air and wind is best, therefore, alfalfa should be cured in cocks, instead of in the swath, because the leaves pump water out of the stems if they have not been burnt. Otherwise, water remains in the stems, and the hay is cured slowly and unevenly.

Pasturing

Alfalfa may be pastured if due care is used. For hogs it is especially valuable, and if mixed with such grasses as timothy, blue grass, orchard grass, or bromus inermis, there is little danger of cattle bloating or of injury to the alfalfa plants.

However, trampling may easily ruin a fine stand of pure alfalfa. In view of this it is hardly wise to turn stock on the field until a year or two before it is to be plowed up.

Cultivating Alfalfa

After the first year alfalfa may be cultivated with a spring tooth or special alfalfa harrow, immediately after cutting, when the soil is relatively dry. Grass and weeds, being comparatively shallow rooted are pulled out, but the teeth of the harrow slip around the deep rooted alfalfa plants without injuring them. This method of cultivation eliminates a serious objection to top dressing with green manure which is usually full of weed seeds.

Disking is no longer recommended.

Rotation

Alfalfa may be made an invaluable part of the rotation.

Coburn says: "Where alfalfa is allowed to succeed itself year after year, a large proportion of the benefit which might be derived from its power to enrich the soil is lost. Alfalfa has little use for the atmospheric nitrogen which it stores in the soil, nor for the surplus of ash elements which it draws from the subsoil, for it can draw more from the same sources as they are needed. Unless alfalfa is followed by crops that need and can make use of the fertility which it has rendered available, this fertility is in considerable measure wasted. The only method of growing alfalfa so that the most benefit may be derived from it is to make it part of a rotation. A non-leguminous crop following a few seasons' growth of alfalfa will make use of the fertility gathered, to the marked profit of the planter."

Leaves Turning Yellow

The first growth of alfalfa sometimes shows yellow. This may be due to lack either of humus or of drainage. Sometimes it is because the young plant is feeding in the surface soil and the condition disappears when the tap root has pushed further down.

Leaf spot is a not uncommon, but not serious disease of alfalfa. Small brown spots appear on both sides of the leaf which becomes yellow and falls prematurely. Leaf spot is most likely to occur during humid weather, and in the second or third cutting. Clipping invigorates the growth and the trouble usually disappears.

Turkestan Alfalfa. A Warning

This alfalfa is imported from Asiatic Turkestan. It is a dwarf variety and we have known of many instances where fields have had to be plowed up because it was unwittingly sowed.

Under ordinary conditions one-fifth of the alfalfa sowed in this country is imported, 90% coming from Turkestan. Thus there is danger of getting this seed. The market value is about \$2.00 per bushel less than home grown seed.

Turkestan seed is duller in color and a good sized sample usually contains seeds of Russian knapweed which are chalky white in color, wedge shaped and a trifle longer than alfalfa grains. We shall be glad to identify any samples sent to us although this can be more satisfactorily done by the Department of Agriculture. Their Bulletin No. 138 deals with Turkestan Alfalfa seed and is very interesting reading.

Varieties

The name alfalfa is given to any plant of the genus *Medicago* that is used as a forage crop. In general, when used without a qualifying term, alfalfa refers to the species *M. Sativa*. Ordinarily the *M. Sativa*, or purple flowered alfalfa is called common alfalfa to distinguish it from the less known varieties. One of the best known of the latter, the Grimm, is classed by some authorities as a member of the *Sativa* species; others, basing their conclusion on the variegated flowers of the Grimm group it with the species *M. Media*. This latter species is thought by many to be the result of a

natural crossing of *M. Sativa* and *M. Falcata*. *M. Falcata*, (yellow lucerne or Swedish Clover), has yellow flowers, and sickleshaped pods; is a native of Northern Europe extending far into Siberia, and is hardier than the *M. Sativa*, though it probably is less productive. The botanists who class Grimm as descending from a cross between *M. Sativa* and *M. Falcata*, explain the superior hardiness of the Grimm as inherited from the *Falcata*.

These three species, *M. Sativa*, *M. Falcata* and *M. Media*, are the only ones that have been grown to any extent in America, though investigators are constantly experimenting with imported varieties in the hope of discovering a plant that will be especially adapted to the arid regions of the West.

There are a number of special strains of the above species of alfalfa based on the development of certain favorable characteristics, principally resistance to drought and cold. We enumerate a few of these below. We can supply other varieties not listed.

Grimm Alfalfa

Fifteen or twenty pounds of alfalfa seed was brought to Carver County, Minnesota in 1857 by a German immigrant named Wendelin Grimm. This seed produced especially hardy plants, and after becoming recognized as a superior strain, it was given the name of the man who introduced it.

It is impossible to distinguish the seeds of Grimm from those of ordinary alfalfa, and the growing plants are very similar. A careful examination, however, shows many of the Grimm plants to be more decumbent than the ordinary. The chief characteristic that makes Grimm superior to ordinary alfalfa seems to be the buried or low-set crowns, and their tendency to spread.

The pictures of Grimm show a most decided branching root system, because they are usually taken from selected plants. In spite of the claims made by many raisers of the seed it is a mistake to call Grimm a strictly branching-root variety and the common alfalfa tap-rooted, for probably not more than 35% of Grimm roots are branched while 25% of the roots of common alfalfa show this tendency. Branching roots are often the result of soil conditions. In loose soils the tap-root will extend straight downward until the water table is reached. If hard soil is encountered the root will branch.

Grimm is thought to be the result of a cross between the common and the yellow-flowered species, or *falcata*, the latter giving the Grimm its peculiar crown and root formation and thus rendering it more resistant to winter-killing. While Grimm blossoms are mostly the same color as those of common alfalfa, usually blossoms of various colors are found.

There is no doubt at all that Grimm is the hardiest of any of the better-known so-called hardy, or variegated varieties, and where winter-killing is likely to occur it should be sown. Authorities disagree as to the amount of hay it will produce as compared with the common. It is reasonable to suppose, however, that if it is a hybrid of the *falcata*, the hay production will be less, although we have noticed little, if any, difference.

The result of tests at nearly all experiment stations shows the superior hardiness of Grimm, there being no difference in its ability to withstand severe winters no matter where the seed was raised. We have grown it for six years, and believe it to be worth the higher price it is necessary to ask for it. It went through the winter of 1911-12, when practically all the alfalfa in our county was destroyed. It is a waste of money to invest in Grimm where winter-killing is not a problem that needs solving.

Unfortunately, the demand for Grimm has been so great that almost any kind of seed would sell. As a result many growers have allowed weeds to infest their fields, and it is difficult to get weedless seed.

For three years we have taken the production of one grower who hand-pulls the weeds from his fields. The seed is nearly perfect. There will be no trouble from weeds in our Grimm.

Cossack Alfalfa

This strain is a natural hybrid of *Medicago Sativa* and *Medicago Falcata*. The original supply of seed was gotten from a single plant in Siberia by Professor Hansen.

The blossoms are decidedly variegated. Great claims are made for Cossack but there seems to be some doubt as to whether it will be much superior to the Grimm.

FIELD SEEDS LESS WEEDS

Liscomb Alfalfa

The Liscomb strain is similar to the Grimm and, like the latter, it takes its name from the original grower, a Mr. Liscomb who first planted it near Miles City, Montana, probably 35 years ago.

It has variegated blossoms and a receding crown.

Its price is somewhat less than that of Grimm, probably for the reason that its worth has not been as conclusively proved.

South Dakota 12

This strain is of unknown origin, but has become rather popular, and commands a somewhat higher price than common alfalfa.

"I will have to have some of your seed again. The Alfalfa I sowed last fall is as fine I think as can grow. I have cut it twice and it has given me 3 tons to the acre the first cutting and 2½ the second cutting and it is just as thick and as fine as it can grow. Now please send me 2½ bu. of your best Timothy seed and ½ bu. of Northern Alfalfa. Please send to New Brunswick, N. J. on the Pa. R. R. and also one bottle of Inoculine for one acre of Alfalfa. Please ship as soon as possible." C. H. Suydam, New Brunswick, N. J.

"The Alfalfa seed purchased of you the year before last was quite satisfactory."

H. L. Moxley, 320 Broadway, N. Y. City, N. Y.

"I have just been informed by the University of Illinois that you had pure Grimm Alfalfa seed for sale. Quote me price on 40 lbs. also prices on any other Alfalfa seed that you have. An early answer is desired."

G. W. Corbin, Wheeler, Ills.

"After receiving and testing a number of samples of Alfalfa seed, I have decided that the sample which you submitted to me some weeks ago will best supply our needs. The purity test of this seed showed it to be almost absolutely pure. There were no weed seeds of any kind, and the only foreign seeds found in the sample were Timothy seeds. The germination test at the end of three days showed 94.85 per cent, which we consider very good."

Yours truly, D. W. Galehouse, Wooster, Ohio

"Last fall I bought 10 pounds of sweet clover seed from you and sowed them on an old, red clay lot where I had never been able to get any kind of clover to grow, and I never saw such a stand of clover as was on the lot this year. It was so thick one could not walk through it, and a great deal of it was 7 feet 10 inches tall and it commenced blooming June 6th, making a fine harvest for the bees, some that was not cut is white with blossom now. I am going to sow 10 acres this fall with seed saved from this lot. Our soil is badly infested with wire grass and sweet clover is the only thing we have which will kill it out."

Miss Mary L. Brown, Clayville, Virginia.

Sweet Clover

SWEET Clover is supposed to be a native of Bokhara in Asiatic Russia and has been known for over 2,000 years. Although brought to this country nearly 200 years ago it is just now receiving the attention that it deserves.

For centuries it has been recognized as a honey plant and its name is due to this feature, *Melilotus* (meaning honey lotus or honey plant).

There are a large number of varieties but only three are well known in this country, namely, white biennial (*Melilotus alba*), yellow biennial (*Melilotus officinalis*), small yellow annual (*Melilotus indica*). The latter is hardly to be considered as it stays in the ground but one year and makes very little growth. In California this seed is a by-product of wheat fields and thus can be sold at a very low price. As a result, farmers and even seedsmen, not being acquainted with its undesirability, buy it, thinking they are getting the biennial yellow at a bargain price. The seed of the *indica* is always hulled; the grains are slightly rough while the grains of the other varieties are smooth. It is a waste of money, time and ground to sow it. Before purchasing, samples should be carefully examined. If you wish to send samples to us it will be a pleasure to identify them for you.

The biennial yellow is not as satisfactory as the white for the reason that it makes not nearly so rank a growth.

When Sweet Clover is mentioned without any special variety being named, it is always understood that the white is meant. There are few countries in the world where it will not grow and it has proven valuable in every section of the United States. It will grow in the most humid and in the most arid sections of the country, on acid, alkali, sandy, raw clay, stony and worn-out soils where there is practically no humus or organic matter at all. It will prevent erosion on hillsides and will thrive on soils on which no other clover can be successfully grown.

A Land Builder. Going much deeper than the plow, the large tap roots decay quickly after the plant dies, facilitating drainage, and adding a great amount of organic matter to the soil.

Sweet Clover will change sand into fertile soil. It is said that King Island off the Coast of New South Wales has been

changed from an island of sand to a profitable grazing country by Sweet Clover.

It improves the texture of gumbo soils.

Sweet Clover has been found to be one of the most desirable crops for enriching orchards.

It prepares the ground for other plants. As an example, Sweet Clover allowed to grow on washed hills will eventually be replaced by blue grass.

It produces more top, root and seed than any other clover. The Illinois Station made an estimate of the total top and roots in a crop of Sweet finding that they amount to 6.38 tons of dry matter per acre in a full grown crop. Think what this means as a fertilizer. If left to grow it attains a height of 18 to 30 inches the first year. The second year it grows to be 5 to 8 feet in height.

Sweet Clover will break up raw clay and waxy soils. In the spring of 1915 we plowed a field, one-half of which contained a vigorous growth of Sweet Clover, our intention being to plant corn. We were unable to plant the corn, the season being wet, and the waxy clay soil poorly drained. The spring of 1916 was also wet but we found no trouble in getting a fine seed bed where the Sweet Clover had been turned under. The other half of the field could not be gotten into shape until late in June on account of clods.

We have sowed Sweet Clover late in August on heavy yellow clay that had been hauled from a new street. Though a decent seed bed could not be made an excellent growth resulted. The stand was left through one season and then turned under for corn which gave a remarkably good yield.

For Pasture. Sweet Clover will make pasturage two weeks earlier than any other plant, and will stand pasturing the year round, even after there have been several frosts. Stock will soon learn to like it, especially if turned into it in the spring before other green food is available. Close grazing is a benefit as it causes the plants to stool. When dry weather has put everything else to sleep Sweet Clover is still on the job, offering an abundance of green shoots. It will stand pasturing much better than alfalfa and is also more satisfactory than alfalfa for the stock. Either on account of the coumarin, a well-known drug used as a tonic, which is contained in Sweet Clover and gives it its bitter taste, or on

account of its more fibrous stems which do not induce gorging, Sweet Clover will not cause bloat, nor overwork the kidneys.

The first year, it can be pastured or it will produce one crop of hay. It can be pastured in about two months after it has germinated. The second year it will produce two crops of hay, or early pasturage and one hay crop, or a seed crop may be substituted for the last hay crop. Sweet Clover makes fine pasturage on that part of the farm where nothing else will make a satisfactory growth. It can be pastured through the entire season and, in that case, will usually produce enough seed to reseed itself. However, when one wishes to make a permanent Sweet Clover pasture it is a good plan to seed both the first and second year, so that, when the old plants die out the second year, year old plants will be coming in.

For Hay. The first year cut when knee high. The second year cut before blossoming; otherwise stems will be woody. Sweet Clover is the equal of alfalfa in feeding value and, the second year, will make from two to four tons per acre. Cut in the morning and rake into windrows before the leaves are dry enough to shatter. The next day put in shocks to cure. If the shocks are large enough for a fork full the leaves will not lose off in pitching. Be sure to have the mower set fully five inches high so that the crown and young shoots will not be injured.

Rotation. Being a biennial like Red Clover, Sweet Clover will fill its place in the rotation. It may be sowed on the wheat in the spring just as Red Clover. Excellent pasturage is then afforded for late summer or fall when everything else is likely to be quite brown. The following spring the ground is turned under for corn.

Seeding. Sweet Clover can be sown at almost any time during the year. Fall seeding is usually done in August or September. The principal objection to late fall seeding is that the plants will die out the next year before the roots have had time to make a heavy growth. Of course this is desirable when the land is to be occupied but one season. As Sweet Clover needs a firm soil, sowing any time from December to March is desirable as thus special preparation of the ground is saved. For later sowing the ground should be prepared just as for alfalfa. The seed should be lightly covered to a depth of not more than one-half inch. Never

plow nor plant deeply. Loose soil is the cause of many failures. Growers who have experienced trouble getting the right kind of a stand in their own well cultivated fields are often surprised to see the plant growing wild along the roadside and on railroad embankments. Although Sweet Clover will do better on acid soils than other legumes, it responds wonderfully to lime. On thin limestone hills, Sweet Clover will thrive, but, if no lime is present, it should be supplied. It will do better on poorly drained soils than other clover. With no nurse crop to take the moisture it will withstand any drought. It should be sown at the rate of 15 pounds of hulled and scarified seed to the acre.

Scarifying. The growing of Sweet Clover is often unsatisfactory on account of slowness of germination which may be as low as 20%. This objection has now been overcome by the use of a scarifier brought out by the Iowa Experiment Station. This machine scratches the hard seed coat and makes it possible for water to penetrate easily. We have installed one of these scarifiers with which we treat all of our Sweet Clover thus raising the germination percentage to 80 or 90 per cent.

Seed Production. Plants should be cut while wet with dew to prevent the seed from shattering, and before the seed is fully matured. The seed may be threshed but the use of a huller is better. The first growth should be cut for hay the mower being set quite high.

The unhulled seed, of course, can not be scarified and it is unwise to sow it.

A considerable amount of hulled seed is imported and contains buckhorn and other weeds, so it is well to be careful in testing samples. One should be on the lookout for the seeds of Indica.

Summary

Only hulled seed that has been scarified should be sowed.
Feeding value is almost equal to alfalfa.
The large roots and fibrous stems break up difficult soils.
Will grow where humus is lacking.
Will prepare the ground for alfalfa.
Furnishes pasture earlier than any other plant. Hogs are fond of the roots and should be well ringed.
Will grow where other clovers fail.
The decaying roots leave large holes for drainage.
Will prepare washed or bare ground for blue grass and prevent erosion.
Is free from plant disease.
Furnishes more matter for green manure than other clovers.
Will grow where even weeds give up.

Red Clover

RED CLOVER was first cultivated in Persia. It was carried to Spain and Italy about the 16th century and was soon introduced into Holland. From Holland it was taken to England and about 1770 to Pennsylvania.

Red Clover is often called June or Medium Clover, the latter term to distinguish it from Mammoth.

It has been found that Red Clover has a habit of drawing the crown of the plant into the soil, thus protecting itself from being uprooted by frost in winter.

However, one of the chief objections to Red Clover is the fact that on our soil it winter-kills more easily each year. Authorities agree that this increasing tenderness is caused by the continued depletion of humus. Of course, winter-killing may be caused by poor drainage but abundance of humus provides ventilation and helps to prevent water-logging.

Clover sickness is usually due to the absence of available plant food because of the exhaustion of potash and phosphorus from the soil. It is often due to an acid condition. In many instances it will be found advisable to inoculate the seed even though Red Clover has been raised on the field in former years.

If as much care was used in preparing the seed bed for Red Clover as for Alfalfa the yields would be wonderfully increased and winter-killing would be lessened. If possible Red Clover seed sown in the early spring should be drilled or raked in or covered in some way. If a fertilizer is used it should be one rich in phosphorus, as most clover soils are deficient in that element, though they usually have plenty of potash. The clover will provide itself with nitrogen from the air.

Farmers' Bulletin No. 260 of the Department of Agriculture says, "First-class Red Clover seed should contain very few weed seeds. This means at most but a few hundred and should mean less than 100 in each pound. Even this seems a large number, but clover seed production has not yet received that special attention which insures perfectly clean seed, and a few hundred weed seeds per pound constitutes a small number when compared with the thousands and tens of

thousands of weed seeds per pound found in many samples of Red Clover seed."

These sentences should be carefully read and thought over by any one who expects to sow Red Clover for they very clearly outline the results of careless buying.

By using our test you can be "as good a judge as the seedsman" and need not "unwittingly pay more for seed that will grow than if you had bought the best."

No one ever writes us that he can buy better clover seed than we are selling but quite often we receive samples of seed that can be purchased at a cheaper price. Many of these we send to the Department of Agriculture for a purity and germination test. Practically all of the large number sent to us last year contained more or less weeds; some of them represented seed that was unfit to sow if it cost nothing at all.

In the case of one sample of clover seed sent us by a grange, the seed was purchased because it could be bought for \$10.50 per bushel whereas our seed was \$13.50 per bushel. A Government test of this showed the purity to be 96.68, the germination 54.5. These multiplied together and the price divided by the result just as we suggest doing in our test, show the actual cost of the pure seed in that lot to be \$19.93.

The purity of our seed is seldom less than 99.75 and the germination is probably better than 90%. If figured on this basis the cost of our seed, if every grain was perfect, would be \$15.00, while our seed contains practically no weed seeds at all. The seed bought by the grange contained 17 different kinds of weed seeds, 6,210 to the bushel or 1,552 in the 15 pounds of seed sown on the acre.

This is not an unusual case. Of course it occurs oftener with Red Clover than with other seeds for Red Clover matures about the same time as some of the very worst weeds, as, for instance, buckhorn, wild carrot, sorrel, etc., to say nothing of dodder.

If weed seeds are in Red Clover when sowed it is safe to assume that they will be in the seed crop when harvested, for the progenitors of both probably met each other years before, the weeds seeming to be especially fond of the company of Red Clover.

Last year's seed was satisfactory and Mammoth Clover as ordered, "one in your favor."

G. E. Prindle, Carlton, Mass.

Every year a large amount of Red Clover is imported from Europe. Last year several hundred thousand bushels were brought into this country to supply the demand. Most late buyers had to use this seed. The Department of Agriculture says, that it does not produce as much hay as home grown seed and that it also contains buckhorn. This is another reason for careful testing of samples. Last year it required considerable effort to find enough pure seed to take care of our customers. This year, owing to the dry weather, we have succeeded in obtaining a large stock of extraordinarily pure seed. This will go much farther than ordinary seed and, as compared with 90% of the Red Clover on the market, should easily add enough to the crop to more than pay for itself.

We sell more Red Clover than any other seed and, through special attention given it, we expect to continue to furnish seed that is free from weeds. We are proud of our Red Clover.

It is generally supposed that Red Clover seed is used in dye-making but this is not true. No record of such use has been found although the matter has been carefully investigated by an employe of the Bureau of Plant Industry. In an old Swedish Encyclopedia he found mention of the fact that poor peasants sometimes used clover blossoms for coloring.

Mammoth

MAMMOTH CLOVER, also called English, Sapling, and Pea Vine Clover, like Red, is a biennial, but where soil and climate are particularly favorable, or where prevented from producing seed, it is likely to show a perennial tendency.

As Mammoth Clover matures about three weeks later than Red it is better suited for sowing with timothy or red-top, red clover being overripe at the proper time for harvesting either timothy or red-top.

Mammoth grows to a greater height than red, has larger roots that penetrate to a greater depth, and for this reason will often do well on soils where medium clover will make an unsatisfactory growth, the vigorous growth of the Mammoth enabling it to gather more plant food from impoverished soils.

On poor soils Mammoth makes more desirable hay because the growth is not so rank. The long roots enable it to withstand drouth and winter-killing better than red. On sandy soil it is superior to red clover which it excels as a green manure crop on account of its large growth of roots and stems.

While the hay is coarser than red clover hay it has the advantage of ripening a month later at the time when there is less danger from rain.

If a seed crop is to be made the clover should be pastured until about June first or clipped, otherwise the plant is likely to exhaust itself in the production of stems and leaves. If the weather is especially dry care must be used in pasturing as the plants may not receive enough growth to produce a large seed crop. On very poor soils it may not be necessary to pasture at all.

Mammoth makes a much surer crop of seed than red. It matures seed about three weeks earlier. Some growers assert that seed is produced just between two broods of clover weevil which often do much damage to red clover.

The very heavy growth usually smothers out most of the weeds and as a result we can always furnish Mammoth that is free from weed seeds. It seldom contains blasted grains.

For the last seven or eight years we have made a specialty of Mammoth for the reason that we have received many letters inquiring for Mammoth from farmers who complained that whenever they had bought Mammoth they had to reap a crop of red. Of course this is provoking and we determined to furnish Mammoth that could be relied upon. We sell an increasing amount of this seed each year.

One man wrote us that he had looked for Mammoth as long as Ahab looked for Elisha; another said that he has been trying to sow some Mammoth for twenty years.

We know our Mammoth is true to name. Ten to fifteen pounds per acre are sown.

I have been going to write and tell you how well pleased I was with the seed that I got from you last spring. It was grand, the best stand I ever got. If you do the same this time will not forget you when I need seed again.

L. B. Andric, Lisbon, Ohio.

Alsike

ALSIKE seems to have been first cultivated near the village of Syke or Alsike, Sweden, and to have been introduced into England in 1834. It is not known when it was brought to America. On account of its appearance and habit of growth it was once thought to be a hybrid between white and red, but is now supposed to be a distinct species.

While not strictly a perennial it usually remains in the ground for several years. Enough of the heads escape the mower and the grazing of stock to do much toward reseeding. It is not nearly as particular about acid soils as red clover and will withstand winter-killing much better. It should be used in mixtures on any type of soil where the seeding is to remain more than three years, in this respect being preferable to red which dies in two years.

It is particularly adapted to wet soils, sometimes doing well in standing water.

Being free from the diseases that affect red clover, it will grow on most soils even those that raise an indifferent crop of red.

The hay is finer than red clover hay and is preferred by stock, but less is produced per acre.

Alsike gathers nitrogen from the air the same as red clover, and would be as valuable in the rotation as a soil builder except for its smaller root and stem growth.

Alsike and timothy ripen together and the alsike does not crowd the timothy as badly as red clover does. For these reasons alsike is preferred for growing along with timothy. Because the alsike does not crowd it is often sown with red clover. It interferes but little with the growth of the red clover and should the latter fail to grow or be killed the alsike will quite likely take its place. Often alsike, on account of its spreading roots, will keep the red clover from "heaving" out. Much less alsike than red should be used.

Except where grown for seed it is usually best to sow some other seed with alsike, such as timothy, orchard grass, blue grass, or red clover.

A good hay mixture is 3 parts timothy, 2 parts red, and 1 part alsike.

There are approximately 700,000 alsike seeds to a pound,

and 250,000 in a pound of red clover, so it takes much less of alsike to sow an acre of ground, probably not more than five pounds.

As the seed is so small it should be lightly covered.

Probably because of acid soil, Canada thistle, sorrel and buckhorn infest many of the sections where alsike is raised for seed, so it is well to look out for these weeds when testing samples. They cannot be entirely removed in cleaning, as many of the weed seeds will be the same size as the alsike. This is especially true of Canada thistle.

Owing to its smaller size alsike is hard to clean, but, by using care in selection, we are always able to furnish seed that is practically weedless.

This season alsike suffered greatly and we thought we would have only second rate seed to offer, but were fortunate enough to find a carload in the only section (so far as we know) that produced good seed. It is as pure and plump as any we have ever had.

Crimson Clover

C RIMSON CLOVER is said to be a native of Southern Europe. It was introduced into Chester County, Pennsylvania in 1820 but, until 1880, its distribution was quite limited.

Crimson Clover is a winter annual, that is, being sown in late summer it goes through the winter in a green state and matures its seed and dies in the spring. It will seldom stand the winters north of the 40th parallel. Although it is often used on the sandy soils of Michigan with success, being somewhat protected by the snows, it is best adapted to humid regions where the winters are rather mild and even. It will grow on almost any type of soil. On stiff clay or sandy soils where red clover refuses to grow it will do well, especially if fertilizer containing phosphoric acid and potash is used to give the young plants a start. Crimson does especially well along the Atlantic coast from New Jersey to Georgia and has filled the needs of a clover suited to southern soils.

Its chief use is as a green manure crop. When plowed under it decays rapidly. It is an intermediate crop growing at a time when it does not conflict with money crops such as corn, cotton, grains or vegetables. It can be seeded after

any crop that is removed 100 days before frost. The root growth is large and the soil is greatly benefited even after the hay crop is removed. Fertilizer may be applied to the preceding crop or at the time of seeding or very early the following spring. Crimson Clover will do much better than red clover where lime is deficient.

Crimson Clover is often sowed with a light seeding of buckwheat or cow peas and even cow horn turnips, the Crimson being thus afforded shade from the hot sun which often kills the young plants. This is especially desirable if the seeding is to be done very early. If sowed late with grain, winter oats, wheat, rye or barley are used.

Where Crimson Clover has not been seeded before it should by all means be inoculated. The Alabama Station harvested 4,056 pounds of hay from an inoculated plat; from another plat of the same size uninoculated, only 471 pounds.

Fifteen pounds per acre is usually sowed, the seed being very lightly covered. The seed is sown according to latitude from August first to October first. Practically all of the Crimson Clover sowed in this country is imported from Europe. This means that the seed usually contains the seeds of noxious weeds so that a careful examination should be made before buying. (Use our test.)

White Clover

WHITE CLOVER is usually called White Dutch to distinguish it from White Sweet Clover. White Clover is a native of America.

Its chief value is when used for pasture or in lawn or pasture mixtures. It is a perennial making its best growth on rich moist soil but will grow on almost any soil. When sowed in mixtures it will furnish nitrogen for itself and the grasses, besides making a balanced ration. It will stand any amount of trampling. If unmixed, during August when maturing seed, it will cause horses to slobber, owing to the acrid nature of the seed. On account of its creeping root stocks and the abundant production of seed it spreads rapidly. It does not winter-kill and remains green from early spring until late autumn. It withstands drouth better than alsike and red clover.

Often seeds of White Clover, which are harder than the seeds of most clovers, will lie in the ground several years until

a very wet period, followed by warm weather, causes them to germinate. The result is that we have what is known as a White Clover year.

There is no honey better than that made from White Clover blossoms. There are over 800,000 seeds to the pound.

Japan or Lespedeza

THIS was brought to us from Japan. It was first introduced in South Carolina and is becoming popular in most sections of the South. It is an annual. It has deep roots and will grow on very poor soil, but does not, like crimson clover, do well on sandy soils.

Vetch

TWO kinds of Vetch are of agricultural importance in this country—Common Vetch (*Vicia Sativa*) and Hairy Vetch (*Vicia Villosa*). The common Vetch is subdivided into spring vetch and winter vetch. The hairy vetch also is called winter vetch and is so listed by some seedsmen, but the term "winter" belongs to the common vetch by priority of use and is probably more widely known in that connection. It is therefore advisable to order the *Villosa* under the designation "hairy" or "sand" vetch.

Common Vetch is an annual and is rarely grown except in the Pacific coast states. The spring vetch will succeed where Canada field peas do, but the latter is the more valuable crop.

Hairy Vetch is a biennial if planted in spring and is much hardier than the common. It will grow in most localities and will succeed on poor land. Its name "Sand" vetch refers to its value as a crop for poor sandy soils. Vetch usually makes a good crop in spite of drought.

Hairy Vetch is very hardy and may be fall sown in all the northern states. It may be sown in corn at the last cultivation for green manure or hay. It is valuable in the eastern half of the United States where crimson clover cannot be grown.

It is especially well adapted to the sandy soils of Michigan where it is used as a winter cover crop or for seed production.

Vetch is sown alone or with wheat or rye as a supporting crop. Where the winters are severe the nurse crop is indispensable.

Late summer is the best time to plant, say from the last of July until the middle of September, sowing from 25 to 35 lbs. of Vetch with one bushel of rye. The more Vetch sown the more the soil will be helped.

Vetch grows rather slowly in the fall, but recovers quickly in the spring and makes an abundant growth which may be plowed under or pastured or cut for hay.

Vetch may be seeded in the spring, either by itself or with a nurse crop such as oats or barley. Sometimes it is mixed with Canada peas and oats. In any case it will furnish excellent summer pasture.

It is almost necessary to inoculate Vetch if the best stand is expected.

Most of the seed in this country is imported and is often mixed with the common vetch, which is much cheaper in price. It is comparatively free from weeds, but often contains many hard grains which make the germination low.

This year we expect to be able to supply home grown Vetch which has the advantage of being unadulterated, free from weeds and of much higher germination than the imported vetch.

Soy Beans

THE Soy Bean is a native of Eastern Asia, coming from China or Southern Japan. In this country it has been an important crop for about twenty years.

It is large, upright, branching, and resembles a tall-growing hairy leaved, hairy stemmed field bean. It grows from 1½ to 4 feet high. The short hairy pods usually contain two or three seeds which are of various colors. They resemble peas more than beans, as they are short and round.

The soy requires from 90 to 150 days to mature. Some of the varieties will mature as far north as Northern New York, but, the plant having originated in a warm climate, many varieties will not ripen except in the South.

It does best on light, warm, sandy loam, but it will grow in poor soils and each year increases the fertility of the land by means of the nodules on its roots. It endures drought, and stands excessive moisture fairly well.

FIELD SEEDS LESS WEEDS

The plant is moderate in its fertilizer requirements. Lime, applied previous to seeding, should be used on acid soils, though liming is not as essential as with other legumes. A very light application of nitrate of soda will start the young plants out in thrifty condition. For perfect development the soy bean requires $2\frac{1}{2}$ times as much potash and nearly two-thirds as much phosphoric acid as nitrogen.

The soy bean is used for green manure, hay, forage, grain and silage.

As green manure a crop of soys is equivalent to a good stand of crimson clover and is better than cow peas. The Experiment Station at Geneva, New York, says: "It is very doubtful whether it is ever wise to turn down the entire crop of either legume (soy bean or cow pea) for green manure, the wise plan being to leave the refuse only on the land, feed the crop and return the manure to the field."

Soy bean hay resembles alfalfa hay very closely in percentage of protein and in percentages of digestible nutrients.

Alfalfa Hay.....	14.3 Per Cent Protein
Soy Bean Hay.....	15.4 Per Cent Protein

Digestible Nutrients

	Protein	Carbohydrates	Fats
Alfalfa Hay.....	11.0	39.6	1.2
Soy Bean Hay.....	10.8	38.7	1.5

As might be expected trials made at experiment stations show that for milk and butter production soy bean hay is nearly as good as alfalfa hay. The soy bean will never take the place of clover for hay, but it is invaluable to fill in with, in case of failure of a clover seeding or of a spring crop.

Combined with Kaffir corn, sorghum or millet, the soy bean supplies one of the best green feeds for the dairy. The forage produced by the soy is higher in protein than can be obtained from any other annual crop of equal yield.

Milk can be produced by feeding soy bean stover at less cost than when corn is used. At the Newark, N. J. Station excellent results were obtained by cooking the stover for growing hogs.

The crop is profitable for hogging down.

The analysis of meal from soy beans shows at least 35% protein, which compares favorably with linseed and cotton seed meal. Meal from the soy bean has none of the bad effects of cotton seed meal. One bushel of bean meal is equal

to 2½ or three bushels of corn for pork or beef production. The soy bean can be used in place of oats in the rotation, and its availability as a substitute for linseed and cotton seed meal gives it an advantage over oats. Soy beans produce three times as much protein as oats. Being rich in protein the beans are a most valuable addition to the home grown concentrates for balancing the ordinary carbohydrate-rich ration.

In order to get a large amount of hay in sections so far north that beans will not develop on the late heavy growing varieties it is an excellent plan to mix with these varieties 4 or 5 lbs. of Early Brown or Ito San to the acre, as these will mature beans and thus make the hay richer in protein.

Seeding

In seeding soys the seed bed should be prepared about the same as for corn, cultivating at intervals in order to kill weeds, for, like alfalfa young soy bean plants are easily crowded out by a rank growth of weeds. They may be sown about corn planting time but not until all danger of frost is past and the ground is warm. The seed should be sown not over 1 to 1½ inches deep. If a seed crop is expected they should be sown as early as possible but for hay or green manure they may be sown quite late, even into July, the variety used making some difference. Although solid drilling requires more seed to the acre and in wet seasons there may be some annoyance from weeds, many growers prefer this manner of planting for hay, silage or green manure crops. From 4 to 6 pecks are used. Laboratory experiments in New Jersey point to an increased or intensified use of atmospheric nitrogen when legumes are planted close together. When so planted there is possibly a greater recovery of nitrogen from the air per acre. Thick seeding is probably best for sandy soils. Planting in rows saves seed and permits cultivation. The rows should be 28 or 30 inches apart with the beans drilled about every 2 or 3 inches. This requires about one-half bushel of seed per acre.

The plants when coming up are brittle and break very easily and no cultivation should be attempted while in this state. It is an excellent plan to use the weeder before the beans come up and even after they have been up a few days. This is the only cultivation that can be given, when planted solid. This should be done in good weather in the middle of

the day but not when the plants are wet from dew or rain. All cultivation of beans planted in rows should be level and shallow.

Harvesting

For Hay. The hay crop should be cured with a minimum of handling. It may lie in the swath one or two days. Raking should be done in the morning or late afternoon to avoid shattering and the hay thrown in small cocks to finish curing. If turned occasionally the hay will endure considerable wet weather.

Cut when the pods are well formed as the leaves are not so apt to be lost and the stems are more palatable and more digestible than when older. There is no time to be lost as the stems become nearly worthless as they mature. Soy bean hay will probably stand more wet weather than will any other kind of hay.

For Silage. For the silo it is best to mix with some other crop. Three loads of corn run through the blower or cutter, followed by a load of soy beans makes a palatable roughage and one that is rich in protein. The juices of the corn soften the soy bean stems. They can be used much ripper than for hay as they go into the silo without curing.

Cornell University in a series of experiments found that non-leguminous plants grown with legumes that had been inoculated contained a great deal more protein than when grown alone. As an example oats grown with field peas contained 7% more protein than oats grown alone; timothy with red clover 44% more. It seems reasonable to suppose that corn grown with inoculated soys should contain more protein than when grown by itself.

There are several methods of growing corn and soys together for silage, especially if ordinary corn is to be used with a rather late maturing soy bean. Corn and beans may be mixed together and planted with a corn planter; or the corn may be planted alone, then the rows planted to soys, not deeper than an inch. Another method is to plant the soys with the corn planter, then using the hand planter, plant the corn in hills. The order may be reversed planting corn and then soys. If inoculated the soys will not rob the corn of nitrogen but rather will furnish an additional supply thus increasing the growth of the corn. A most approved method in making silage from corn and soys is to use a separate field

for each. In this case a late variety of corn may be used the soys being planted 2 or 3 weeks later according to their time of maturity.

For Seed. For seed soy beans must of course be planted in rows and cultivated. They should be cut before all the beans are ripe to avoid loss by shattering. They must be handled with the dew on. They may be harvested with a binder or mower with side delivery attachment. There is much danger of the seed spoiling if put in bins or sacks too soon after threshing.

Inoculation

There is no question at all but that soy beans should be inoculated. They may grow nearly as well without inoculation but will do this at the expense of the soil. When inoculated the roots become filled with large nodules which makes them the ideal crop for soil building. There is also little doubt that when they are inoculated the protein content of the plant is much greater. For reasons stated before we believe it is especially important to inoculate soys that are to be planted with corn. In 99 cases out of 100 "no inoculation means no nodules."

Soy beans can be successfully grown by any one and they will surely make any grower a more successful farmer.

While there is little danger of sowing weeds with soys there is some danger of planting soys with a small percentage of germination as they are easily injured in the curing process. There is also likelihood of planting a lot of split beans.

We have the most improved machinery for cleaning them and believe we are furnishing better beans than can be purchased most places.

We give below dates of maturity for Ohio. The number of days required for the ripening of beans will vary somewhat with the locality.

In ordering soy beans we shall be glad if first and second choice is given. Dry weather and early frosts have made nearly all varieties scarce and we expect to be out of several of them before the season is well along. We shall undoubtedly have several varieties not listed here.

Ohio 9035

This bean matures seed in 120 to 125 days. It is the best bean developed by the Ohio Experiment Station which prob-

ably has done more work with soy beans than any other station. It is an erect bushy plant growing to a height of about 30 inches. The leaves are large. It is probably the largest seed and hay producer. For Central Ohio and farther south there is no better variety either for hay or for seed production. Farther north in cases where a large quantity of hay is desired it will be found to excel most other varieties. It probably resists shattering better than any other bean, an excellent point in its favor.

Early Brown

We sold this bean last year for the first time, thinking that it was exactly the same thing as the Ito San except in color. We were somewhat surprised in buying soys this year to find that although there are a large number of Early Browns throughout the country Ito Sans are quite scarce, last season having been specially trying on soys. We felt sure that it must be earlier than the Ito San or more drought resistant, so we wrote Mr. E. E. Evans of Michigan, who introduced both the Ito San and Early Brown as well as many other varieties. He informs us that the Early Brown is a better variety than the Ito San, besides being earlier. For an early bean we know that it will prove hardier and more satisfactory in every way than the Ito San. It is a few days earlier than the Ito San and produces more hay.

Ito San

This is a very well-known variety growing 24 inches high. It matures seed in about 110 days. It is a large seed producer and suitable for an early manure crop. On account of the smaller growth it is not as suitable as other varieties for hay and silage.

Medium Green

This bean matures seed in about 120 days. It is excellent for forage and hay, being especially popular in the New England States. It is a fine bean for soiling and ensilage but unfortunately it shatters so badly that growers are discontinuing it as a seed producer, with the result that the Medium Green beans are very scarce and higher in price than most others.

Holly Brook

This is a rather late variety maturing seed in about 125 days. It is a large seed producer and grows to be about 36

inches tall. It is coarse but good for hay. It is rather popular for planting with corn for hogging off or for silage.

Roosevelt

This is a rather tall growing variety maturing in about 120 days. It is a heavy yielder of hay and seed.

Medium Yellow

A number of different kinds of beans are shown as Medium Yellow, most of which are desirable.

Mikado

This variety grows to a height of about 30 inches, maturing beans in 125 days. It is excellent for grain but the stalks and branches are somewhat coarse.

Wilson

This is a black seeded variety. It is quite a large producer of seed and hay. It matures seed in about 125 days. It is a popular bean but it is always difficult to procure seed. It grows to be about 40 inches tall.

Ebony

This is more decumbent than some of the other beans, much like the Wilson and several other black seeded varieties. It matures in about 120 days.

Mammoth Yellow

This is a very late southern grown variety. It will not mature beans north of the Ohio River. In Southern Ohio it is grown quite extensively for hay and makes desirable feed when mixed with 5 or 6 pounds of Early Browns and Ito Sans which mature their beans about the time the Mammoth is ready to cut for hay.

Canadian Field Peas

FIELD PEAS are usually spoken of as Canadian Field Peas, the name having been given when the plant was comparatively unknown and the seed mainly imported from Canada. However, few varieties originated in that country.

Being a legume they are soil improvers and furnish a ration rich in protein. They can be sown for soiling and fodder and are unsurpassed for green manure. They are usually sown with oats, about one bushel of each, thoroughly mixed. This combination makes a very desirable hay or soiling crop, the yield being quite large.

Unlike cow peas they should be sown as early as possible in the spring, and do best farther north than Central Ohio.

One bushel of field peas, one bushel of oats, 4 pounds of Dwarf Essex Rape and eight pounds of sweet clover make excellent hog pasture that can be sown in the spring, the pigs being turned in when the oats and peas are about eight inches high.

Cow Peas

THE Cow Pea, a native of Asia, was introduced into this country over a century and a half ago, and soon came into general use in the Southern States. Here it has remained a successful crop, owing to the fact that frost seldom interfered with its growth of foliage; however, the cow pea has gradually found its way into northern latitudes where it has been of high value as a forage crop and a soil improver.

The growing of the cow pea serves to improve the soil in two ways. It not only breaks up a stiff clay soil, but like other legumes has the capacity of taking nitrogen from the air. An even greater advantage is seen in the fact that it makes a considerable growth on land which will not produce red clover and other legumes, and which is not suitable for the growing of other grain crops.

The feeding value of the cow pea is equal to that of red clover and ranks high in palatability and digestibility. Its high percentage of protein makes it even more profitable for feeding purposes.

Cow Peas should be sown as soon as the ground is thoroughly warm and dry. When sown with a seed drill, about six pecks of seed should be used. On well drained land Cow Peas will make a fairly good showing, although the plant is best adapted to a rather sandy soil. Harvesting should begin when the first pods show signs of ripening.

Where the land has not grown Cow Peas before, inoculating material should be used, as experiments have proven that it adds much to both the crop and the soil.

The most common varieties are the New Era and Whip-poor-will, although the Black, Clay and Michigan Favorite are well-known varieties. For very late planting the New Era is recommended.

Timothy

THIS grass was first brought to this country from England by Timothy Hanson of Maryland in 1720. In some parts of New England it is known as Herd's grass, it being said that John Herd found the grass growing wild in a swamp in New Hampshire as early as 1700.

Timothy is distinctly a grass for hay rather than pasture as it does not take kindly to trampling and close grazing. It is our hardiest and best known grass and is a part of all mixtures.

The facts concerning seeding, harvesting, etc., are so well known that it is unnecessary to enumerate them.

Although it is not difficult to procure high-grade seed, it is almost impossible to distinguish blasted and immature grains from viable seed. The careful examination and comparison of samples is therefore a matter of importance.

Often timothy seed contains a considerable amount of sorrel owing to the fact that both grow on acid soil. It is well to be on the lookout for this as well as for Canada thistle which is not easy to identify in timothy seed.

In timothy seed you will nearly always find a small amount of alsike, and quite often grasshopper specks. It is not possible to entirely remove either of these, and while they hurt the looks of the seed they make no difference in the quality, and should not be confused with black plantain which is somewhat triangular and flat.

One peck is the amount usually sown per acre, or if clover is to be sown in the spring—a bushel to six acres. A satisfactory mixture is 7 pounds timothy, 7 pounds red and 3 pounds alsike.

We have an extra fine lot of timothy seed this year, probably the best we have ever had.

Timothy and Alsike

TIMOTHY meadows generally contain a certain amount of alsike clover and when the seed from such meadows is run through our cleaner it is impossible to separate the alsike from the timothy. Especially in clover years large amounts of this seed are brought to us, some lots containing quite a large amount of alsike. The seed, being mixed, has a less market value than if it were separated,

and for this reason we can usually supply timothy and alsike mixed at bargain prices.

Timothy grown with a legume will do better than when grown alone.

Timothy and alsike are alike in many respects. They do well on the same types of soil, ripen at the same time, and are suitable to the same conditions of climate. The sowing of timothy and alsike is therefore recommended by experiment stations. There is no doubt that the mixed hay has a much larger feeding value than timothy alone.

Timothy and alsike mixtures have become quite popular of late years, but, unfortunately, this has led some people to take advantage of the fact that it is difficult to recognize dead grains and weed seeds in them. Hand-made mixtures composed largely of tailings and inferior seeds are now being offered. We have sent more than one of these mixtures to our experiment station only to have it returned to us with the information that it was tailings and that no purity test could be made.

Timothy that is chock full of plantain and unsaleable at any price can be mixed with low grade alsike and sold as a good timothy and alsike mixture, although the percentage of germination may not be over 10 per cent. This seed will undoubtedly contain a very large percentage of Canada thistle, buckhorn, sorrel and plantain, just such weeds as it is impossible to clean out of timothy and alsike. Of course there is no need of sowing this kind of seed, but, for some reason, many farmers are unwilling to take the trouble to have samples analyzed by their experiment stations or even to use the simple test which we suggest.

Our timothy and alsike is a natural mixture, just as it comes from fields of mixed hay. By using our test you can very easily see that it is free from weeds.

Grass Mixtures

GRASSES may be divided into two classes, hay and pasture, or tall and short.

Some of these grasses grow in bunches and some have creeping stems. For either hay or pasture as well as for soil improvement a mixture of grasses and clover is of greater value than any one kind grown alone.

Pasture Mixtures

A mixture gives a longer period for grazing, furnishes a greater variety, yields a crop richer in protein and makes a better balanced ration than would the grasses composing the mixture if sown separately. But it does not pay to sow in a mixture any grass that will not do well alone. In choosing the grasses to go into the mixture such varieties should be selected that the good qualities of one will balance points in which the other is deficient. For example, the grass that forms roots on the surface is not desirable from the stand point of fertility; another may send its roots fairly deep but not be as suitable for a pasture grass as the other. The two make a combination well adapted to grazing and maintaining the fertility. Pasture Mixture grasses should be selected with respect to their periods of growth so that grazing may be done through the longest possible period.

An example in support of this plan is cited by the Kansas Experiment Station as follows: A combination of Orchard Grass, *Bromus Inermis* and Meadow Fescue is taken. Orchard Grass starts early in the spring, makes a rapid growth and matures early in the summer. Meadow Fescue on the other hand starts late in the spring and matures late in the summer. *Bromus Inermis* is different in character from both of the other two. It starts early in the spring and usually continues to grow throughout the summer. One can readily see that this combination of grasses would be of far more value for pasture than any one of the varieties could possibly be if sown alone.

The Department of Agriculture found that grasses with a strong root system, like Meadow Fescue and Rye Grass, will prevent the winter-killing of other weaker grasses and clover. In a series of tests, the plot giving the best results was the one containing the largest number of grasses. We like to include in our mixtures quite a large number of varieties.

Always a small amount of various clovers should be added to the Pasture Mixture as legumes not only feed the grasses by pumping plant food from great depths to the surface, but also supply them with nitrogen drawn from the air, and, no doubt, greatly increase the protein content of the grasses. A small amount of alfalfa will do much towards getting the soil inoculated. White clover will grow where nothing else will

and alsike does well in wet places. Due consideration must be given to the fact that the kinds of grasses that should be used depend upon the locality. Even in a single field parts will be found that are adapted to grasses that will not thrive in the rest of the field.

In making our mixtures we closely follow the suggestions of the different State experiment stations but, while we have different mixtures for different states, it can be seen that it is wise to tell us the sort of ground for which they are intended.

A pasture should not be merely sowed and left to shift for itself. Beef and milk can not be produced by grazing it without taking from the soil large amounts of plant food. Manure should be used where possible or at least a commercial fertilizer containing a large amount of phosphorus. Outside of the limestone district applications of lime will be beneficial.

A thorough mowing in July or August prevents weeds which the stock had not eaten from appropriating moisture which the grass should have. Mowing prevents weeds from going to seed and by cutting them off at this time many are killed. When pastures are dry it is an excellent plan to harrow thoroughly.

Meadow Mixtures

MEADOW mixtures, in contrast with pasture mixtures, should contain only grasses that mature at about the same date.

For reasons already stated it is more profitable to sow a mixture of several grasses, including clovers, for hay rather than to sow one kind alone for then the roots fully occupy the ground to a considerable depth, each variety getting its food from a different level, the legumes acting as feeders for the grasses.

The quality of seed has a greater influence on the production of hay than has any other factor, for the seeds of most of the grasses are very light in weight and often are injured during the curing process. High-grade grass seeds, especially those that are free from weeds, are extremely hard to get but by giving the matter special attention, we have in all varieties seed of high germinating power, the quality being far above the average.

Wet Land Pasture Mixture. Nearly all grasses are well adapted to and can be profitably grown on ground that is low and moist but not swampy.

Dry Land Pasture Mixture. This mixture requires drought resisting grasses that need to be more carefully selected than grasses for wet land.

Sour Land Mixture. In this mixture we have grasses particularly adapted to acid conditions, a smaller amount of clover being used. It is not a difficult matter to get a good stand of grass on ground of this kind if a good seed bed is prepared.

Dry and Wet Meadow Mixtures. These mixtures are very carefully selected so that the grasses and clover will ripen at practically the same time. We cannot recommend them too highly for they are composed of high germinating seed that is practically free from weeds. The usual amount sown for both pasture and meadow is from 20 to 25 pounds.

Kentucky Blue Grass.

(*Poa Pratensis*)

This variety of grass is native both to Europe and to North America and along with two or three other similar species is the greatest American pasture grass. Authorities are of the opinion that it is grown more or less in every State in the Union. It makes the best sod of any of our grasses and does fairly well on a wide range of soils, although it is better adapted to clay than to sandy loam. It is a very nutritious pasture grass, but has little value for hay. The fact that it is both an early spring and a late fall grower makes it valuable for grazing at both ends of the season. Kentucky Blue Grass constitutes a part of practically every lawn and pasture mixture.

When sown alone from 30 to 40 pounds per acre should be used.

Owing to the light weight of Blue Grass Seed it is difficult to remove weed seeds and the germination is often quite low. This is true this season especially, for although there have been several large crops during the past three years, none of them have made really good seed. There is much old seed on the market, so care must be used in buying as it is extremely difficult to get seed of high purity and germination. After much trouble we have been able to get a quantity of really high-grade Blue Grass.

Contrary to the opinion generally held the best Blue Grass seed is produced not in Kentucky, but in Northwestern

Missouri. One reason for this is that in Missouri strippers are used that will handle only the ripe seed whereas in Kentucky the business is conducted on such a large scale that contractors begin stripping before the seed has ripened.

Orchard Grass
(*Dactylis glomerata*)

Orchard Grass, known as Cocksfoot in England, is a native of Europe. Its American name is due to the fact that it is successfully grown in partially shaded places.

Orchard Grass will stand more drought than Kentucky Blue Grass, but is not especially adapted to dry land conditions. It starts very early in the spring and grows rapidly, so that it is valuable in a pasture mixture. Orchard Grass is inclined to grow in tufts or bunches so that it will not permit an even sod. Although of high nutritive value it is not relished by stock as well as blue grass and redtop. It thrives best on rich, well drained loams and makes a good growth in shady places. Twenty-eight pounds is the amount usually sown per acre.

It is seldom possible to get Orchard Grass that does not contain a considerable amount of dock and sorrel and, quite often, buckhorn, all undesirable weeds. Before we could find seed this year that met our views it was necessary to get samples all over the country. We have a limited amount of Orchard Grass that is almost free from weeds.

Redtop
(*Agrostis Alba*)

Redtop belongs to a species of grasses that are very widely distributed over the globe. It is a perennial which ranges in growth from a few inches to three or four feet according to the conditions of soil and climate. It starts later in the spring than Kentucky blue grass, grows slower and matures later. Redtop is valuable for pasture and hay, but does not equal timothy. While adapted to a great variety of soils it does especially well on wet bottoms and should always be included in mixtures for such land.

Although Redtop is a light-weight seed we find it much easier to furnish it free from weeds. About 15 pounds of clean Redtop should be sown per acre.

"I went up to my farm today and inspected the seed sent by you. It is fine and I am much pleased."

C. P. Dyar, Marietta, Ohio.

Meadow Fescue
(*Festuca pratensis*)

This variety is a hardy perennial with a strong growing root system. It is well adapted to low temperatures. It also makes a good showing in a warm climate. It is more successful as a pasture crop, although it makes very nutritive hay. Forty pounds of seed per acre should be sown.

Bromus Inermis, or Brome Grass

Brome Grass is a native of Europe and has been grown in the dry steppe region of Russia for centuries. Where continual pasturing is desired it is found quite valuable and it is a wonderful variety for dry soil. Bromus Inermis makes a large heavy growth and is relished by cattle. At least 20 pounds should be sown to the acre.

Tall Meadow Oat Grass
(*Arrhenatherum elatius*)

This is a European perennial grass and is not extensively grown in this country. The grass grows in tufts or bunches and does not make desirable pasture unless sown with other varieties. It is a deep rooted variety and stands drought well.

There is a difference of opinion as to the feeding value of Oat Grass, owing to the fact that it makes a rather coarse hay unless properly harvested. Even though a little below the standard in feeding value, its hardiness as well as its rapid and vigorous growth make it a valuable crop. Sow 35 pounds to the acre.

Rye Grass
(*Lolium perenne*)

Rye Grass is a native of Europe and is a great favorite in England and on the continent. Perennial Rye, probably the most important of the group, is used to quite an extent as hay and is valued highly as a pasture grass. In the United States it has never gained a prominent position, but is recommended for pasture mixtures. Fifty pounds per acre are sown.

Miscellaneous Grasses

Besides the grasses already mentioned, we are able to offer such varieties as Crested Dogstail, Hard, Sheep and Red Fescue, Sweet Vernal, Creeping Bent, Rhode Island Bent, Wood Meadow Grass, Canadian Blue Grass, Bermuda Grass, etc.

Millet

The term millet takes in a large group of forage plants, the Foxtail being the one most widely known in this country.

To the Foxtail group belong the Common, Hungarian, German and Japanese varieties.

German Millet. This is the most largely used variety, being grown to a great extent in the West, most of the seed coming from that section. However, seed of German Millet which is grown in rich ground in Tennessee and cultivated especially for raising seed is more desirable than the western grown seed, although the price is somewhat higher. The amount per acre is 50 pounds.

Hungarian Millet. This is smaller and earlier maturing than the German. The hay is somewhat more desirable as it is not as coarse. The amount per acre is 50 pounds.

Japanese Millet. Makes a larger crop of hay than either of the above and is good cow feed. It was introduced into this country by Professor Brooks of the Massachusetts Experiment Station. It is often known as Billion Dollar grass. The amount per acre is about 15 pounds.

Sudan Grass

This variety of grass was introduced into the United States in 1909 from Khartum, Sudan.

Sudan grass shows a strong resemblance to sorghum. It is inclined to grow in bunches, often as many as 200 stems growing from one crown.

It will grow in almost any State in the Union, furnishing an extraordinarily large amount of forage.

When seeded in rows 40 inches apart about 5 pounds per acre will be found a sufficient amount. From 20 to 25 pounds should be used when sowed broadcast.

Dwarf Essex Rape

This valuable plant has been extensively grown in this country during recent years only.

The cost of sowing is very small as only four or five pounds per acre are required.

It grows from 1½ to 4 feet high and makes a large amount of forage for sheep, hogs or cattle.

Most of the rape used in this country is imported. On account of the small amount of Dwarf Essex being grown at this time, other varieties are offered, many of them of little value, some contain weed seeds.

We have the genuine Dwarf Essex, a limited amount of it being home grown.

Corn

YEARS ago when we heard of people asking three or four dollars for seed corn we thought they were robbers. The selling of good corn seemed a very simple matter and we looked forward to the time when we could get into the business on a large scale and make a lot of easy money. But we did not care to give any of our time to this branch of the seed business until we were sure that we knew enough about seed to be able to supply our increasing list of customers with pure seeds in all varieties of grasses and clovers.

For three or four years we have been fooling along with seed corn, studying it the best we could, though the more we investigated corn the less we seemed to know about it. We have learned this, however, that there is no limit to the value of a bushel of seed corn if it has been carefully bred and selected, is adapted to the section in which it is to be planted, and, most important of all, shows a high percentage of strong germination. We say strong germination, because very often seed that shows a high percentage of germination will make unsatisfactory plants owing to the fact that the corn did not get quite ripe and suffered from exposure to frost, or that it encountered severe weather before being thoroughly cured.

Even after practically all the moisture is removed, corn should be kept well protected. The Office of Corn Investigations of the Bureau of Plant Industry found that well preserved seed gave, on poor soil, a yield 12% higher than poorly preserved corn, and that, on fertile soil, it gave a yield 20% higher. In this case both lots germinated equally well, and came from four bushels of ears, equally divided when husked.

An unsatisfactory yield always results from planting inferior corn, but it is easy to increase the yield five or ten bushels per acre by selecting the right kind of seed.

We have filled our warehouse this year with several hundred bushels of well-known varieties grown under the most favorable conditions. This corn has been carefully tested. Before shelling it will be butted and tipped by hand. Unless the spring rush strikes us too hard the shelled corn will be hand-picked to remove any off-size or broken grains that escape the screens in the grader. Our object is to furnish corn that is different and above the average just as we feel that we are furnishing field seeds that are in a class by themselves.

It is necessary to keep down such rank growing weeds as foxtail, cockle, rag weed, etc., as well as other weeds, in order to save the moisture and fertility of the soil for the corn, which needs both in abundance.

The New Hampshire Station in making tests to show the injury to corn due to weeds, raised 17.1 bushels on an uncultivated plot full of weeds. On a plot cultivated shallow five times, the yield was 79.1 bushels, and on a plot cultivated deep five times the yield was 69.1 bushels.

There is some difference of opinion as to the proper depth of cultivation but nearly all experienced growers agree that at no time, especially after the corn has reached two feet in height, should the roots be disturbed. Probably two or three inches is deep enough to kill the weeds and at the same time miss the roots.

The Illinois Station shows that cultivation at a depth of four inches may cut off 54% more roots than at three inches.

FIELD SEEDS LESS WEEDS

Cultivation, fertility of soil and drainage affect the production of corn but the crop depends first upon the selection of seed.

Cultivation aerates the soil and keeps it warm by preventing the evaporation of moisture. The use of better seed, enriching of the soil and the right methods of cultivation may give double the yield of corn to be expected when these requirements are lacking.

The butt grains are fertilized first, and the pollination of the grains proceed in regular order towards the tip. Owing to this delay in development the tip grains are thought to vary from type more often than the grains on the rest of the ear.

Experiments conducted by the Kansas Experiment Station in the field show that 90% of the middle grains produce plants while only 86% of the butt grains and 70% of the tip grains produce plants.

This shows that corn should always be carefully butted and tipped by hand before grading, for no grader will entirely eliminate these undesirable grains. If they are not removed the planter is likely to drop the seed unevenly which will cause a smaller stand, as a uniform number of grains to the hill or space must be planted if the largest yield is expected.

Drilled corn, on account of the stalks being separated, usually produces a little better than corn planted in hills.

Corn should ripen early enough to escape frost and late enough to make use of all favorable growing weather.

The smaller early types are now believed to be more favorable for filling the silo than the large ensilage corns. To give best results silage must have a larger percentage of nutritive value than is found in the immature sappy fodder of southern sorts. The ears should be ripe enough to be well dented and not too soft.

We can ship corn either shelled or on the ear, the ear corn being slightly higher in price, owing to the extra expense of handling. Crates are so expensive this year that we expect to ship in bags. When shipped in bags, only the tips and butts on a few ears are injured, and these do not amount to anything, not being fit for seed.

In ordering corn please give first and second choice if possible as there will quite likely be a shortage before the season is over.

In describing the different types we have tried to give the exact number of days in which they will mature, as we see no reason for listing a 110 day corn at 85 or 90 or even 100 days. Growing conditions, however, affect the maturity of corn several days either way so it is impossible to tell the exact number of days.

Guarantee

It is manifestly impossible to guarantee corn to grow and make a crop—too many things can happen after it has been planted—but we guarantee our corn to show a high percentage of strong germination in any test that you care to make.

Keep the shipment just as long as you please. If there is anything that you do not like about the corn send it back and we will return your money, paying all transportation charges of course.

With an order for other seed we will include

8 select ears for 50 cents.

6 pounds shelled corn for 50 cents.

History of Clarage Corn

THIS variety has probably a more clearly defined history than most of the corns originated in Ohio. It takes its name from Edwin Clarridge, who moved from Maryland with his parents to Ross County, Ohio, in 1789. At the age of 24 he moved to Fayette County where he sought to improve the corn already popular in that section. His idea was to have an early ripening corn and he chose ears from the stalk with this in mind, selecting those with the straightest rows, deepest grain and best filled tips. Mr. Clarridge died in 1867, but his sons continued to improve the corn.

In years when corn fails to mature neighbors make a beaten path to the crib of the man who has sought to raise a sure corn, one that ripens early enough to miss the frost and still produces a maximum amount of grain. Thus the fame of Clarage corn spread to other counties, and thus Clarage became a standard all over the country.

Although it does well on black ground, Mr. Clarridge chose it especially for clay land and this is where it is most profitably grown.

In 1857 a son-in-law of Mr. Clarridge sought to improve the corn by selecting larger and longer ears. Naturally it matured later. He called the corn Improved Clarage and this has become a standard name for corn that resembles Clarage in type but is somewhat larger. Of course any one that fools with corn thinks he is improving the type.

Ears of Clarage corn are usually from 8 to 9 inches in length, the grains running straight on the cob, and the taper not so decided as in many other varieties.

Little Clarage

This corn has become very popular in our county. The grower of our corn has raised no other for a great many years. Many of the men who have grown it claim that it will ripen in 85 days, but we have found that enthusiastic growers of early corn are usually about ten days off in their estimates of ripening time.

Ears average from $7\frac{1}{2}$ to 8 inches long and the corn never fails to ripen. The cob is small and the production of shelled corn will be about equal to that of many of the larger eared kinds. For an extra early corn we know of none that will surpass it.

Improved Clarage

This is a fair sized corn about one-inch longer than our Little Clarage and would come under the type called "Improved Clarage." It is a heavy yielder and will ripen in the most unfavorable seasons. It is adapted to either clay or black ground. The fodder is somewhat larger than the Little Clarage or 110 Day White. It makes a solid showy corn and will mature in 110 days or less.

110 Day White

(Commonly called 100 Day White)

Of this corn we can not speak too highly. The ears average $8\frac{1}{2}$ to 9 inches in length. We could probably best describe it by calling it a white Clarage. The grains are inclined to be broad and they are never chaffy, but hard and firm and of great feeding value. Altogether, it makes the most solid corn of any variety we have ever seen.

It does equally well on either clay or black land. It is especially adapted for hogging-down or for husking from the stalk, because back of this corn are years of selection with the aim of making the ear waist high and the fodder small. This corn will show practically a 100% strong germination. In favorable seasons it will mature in less than 110 days, being earlier than most of the so-called 100 Day or Early White corns and superior to them. Those who like a white corn will find that this will meet every requirement.

Reid's Yellow Dent

This variety resulted from the crossing of an Ohio and Illinois corn. It was originated in 1846 by Robert Reid who moved to Red Oak, Illinois from Ohio. The ears are from 8 to 10 inches long.

This is surely a thoroughbred corn. Cylindrical, the butts and tips well covered, the grains deep and closely set, it is the ideal ear in appearance. It has probably won more prizes than any other corn. The only trouble is that some growers have bred more for looks than utility.

It is a late corn but ours is earlier than much of the Reid's.

Reid's Yellow Dent is not adapted to clay ground. It is a big yielder and in the corn belt probably the most popular variety.

It makes a desirable ensilage corn, being better adapted for filling the silo than the later southern grown varieties, but yet furnishing a large amount of stalk.

120 Day Yellow

This is well bred corn suitable for those who want something larger than the Clarage but not as late as Reid's Yellow Dent. In every way it is a satisfactory corn.

White Cap

This corn is a cross between yellow and white corn. It has yellow grains with white caps. It is believed that it is better adapted to poor soils than yellow corn but it is also fine for black soil. It is a popular variety and a big yielder, being strong and hardy. The cobs are both red and white. It matures in 125 days.

Ensilage Corn

In Ensilage corn we have Blue Ridge and Clark's Prolific. Both are grown for us in Virginia, as our climate is not suitable for the maturing of such large corns.

Stowell's Evergreen Sweet Corn

This corn is sometimes put into the silo and is often used as a fodder corn.

Wheat

SOME of the desirable qualities in Wheat are, high yield, early maturity, resistance to drought and stiffness of straw. Since we are not able to handle all varieties of Wheat we have selected three which we believe to have these qualities.

Fultz Wheat. Fultz is a red-grained beardless type and a heavy yielder.

Poole Wheat. This is one of the old varieties which has never gone out of date. It is beardless, a heavy yielder, and stands the winter well.

Gypsy Wheat. This is a bearded variety and very desirable especially from the standpoint of stiffness of straw.

Oats

IN THE United States, oats are second in importance to wheat and corn only. There are many different strains and varieties. We have found those listed below to give excellent satisfaction.

Sixty Day. This is probably the earliest known variety and a good yielder.

Swedish Select. This variety originated in Sweden. It is very popular, being especially well adapted to upland soils and poor ground. It has a large root development which enables it to resist drought.

Silver Mine. This is another popular white oat. It is hardy, with a stiff, bright straw. In this variety we have some fine home-grown seed and expect also to have a car from Montana or Canada.

Scottish Chief. We sold this variety in 1916 for the first time, having brought in a carload from Montana. Around Marysville the Scottish Chief increased yields from 5 to 20 bushels per acre. It is a trifle earlier than the average oats raised in Ohio and has a stiffer and shorter straw. We are sure that under no circumstances will it yield less than 5 bushels more than home-grown oats, especially in a year like 1916. The seed weighs 46 pounds to the measured bushel.

Oats are usually sown two bushels to the acre.

Rye

OWING to the fact that less has been done to improve it there are fewer varieties of rye than of other cereals. The Michigan Station, however, has originated a variety which they call Rosen rye. The berry is larger and plumper than that of other rye and the straw is stiffer. We are able to supply this variety and also a superior quality of White rye.

The amount usually sown per acre is $1\frac{1}{2}$ bushels.

Barley

ONE-EIGHTH of the entire production of Barley is raised in Wisconsin where special efforts have been made to increase the yield by establishing pedigreed varieties. These efforts have borne fruit in the development of a more desirable strain.

Experiments have shown that the Wisconsin Pedigreed Barley out-yields the ordinary barley by 5 bushels per acre.

We have an extra fine quality of this Barley which we have very carefully re-cleaned.

We remove all small and blasted grains as well as all weed seeds.

Two bushels are sown per acre.

Beardless Barley

All Beardless Barley for sale in this country is more or less mixed with the bearded variety, so we can not guarantee our seed to be pure.

Beardless Barley does not produce as much grain as the bearded and is used largely for a nurse crop.

For this purpose about three or four pecks are sown.

In addition to the grains described here we can furnish Sorghum, Kaffir Corn, Buckwheat, Cow Horn Turnips, etc.

Lawn and Golf Course Seed

WE GUARANTEE our lawn seed to grow. Owing to its freedom from weeds and dead grains it should go at least 25% farther than other mixtures. We have lawn seed for both ordinary and shady places.

We shall not attempt to go into an extended discussion of lawns and lawn seed here. The matter is too important to crowd into a small space. In our booklet "Weedless Lawns" we believe we have handled the question of making and maintaining lawns a little more carefully than is usually done.

This booklet describes and illustrates the weeds usually found in lawns and tells how to get rid of them, how to keep from sowing them, and how to judge lawn seed, besides giving instructions for the sowing, mowing, watering, and general care of the lawn. It applies as well to the maintenance of golf courses.

We will gladly send the booklet on request.

Legume Bacteria

NITROGEN, which is essential to the growth of all plants and animals, is constantly being removed from the soil. Some of the instrumentalities of its removal are: the growth of grain and other crops, the drainage of the land, and the action of wind and rain. A portion of this loss may be made up by the manure produced on the farm and by commercial nitrogen, but the cost of the latter is too great for profitable use. The only way in which nitrogen can be supplied so that farming may be profitably conducted is to draw upon the unlimited supply in the air.

Anyone who does not believe in the inoculation of legumes as a means of making this free nitrogen available should send to the Illinois Experiment Station for Bulletin No. 94, "Nitrogen Bacteria and Legumes." The author, Cyril G. Hopkins, probably the greatest authority on the subject, presents the subject in such a way that it is easily understood. We wish that we could give the entire matter, but space permits the use of but a few paragraphs.

"The association of nitrogen-gathering bacteria and leguminous plants is a relationship of mutual helpfulness. * * * The legume furnishes a home for the bacteria and also furnishes in its juice or sap most of the nourishment upon which the bacteria live. The bacteria, on the other hand, take nitrogen from the air contained in the pores of the soil, and cause this nitrogen to combine with other elements in suitable form for plant food, which is then given up to the legume for its own nourishment."

* * * * *

"It is not necessary to see the bacteria, because if we find the tubercles upon the roots of the plant, we know that the bacteria are present within, as otherwise the tubercle would not be found."

* * * * *

"The growing of legumes is absolutely essential as a part of any economic system which shall maintain the fertility of the soil; and for the successful growing of legumes the presence and assistance of the proper species of nitrogen-gathering bacteria are also absolutely essential. These facts being granted, it certainly follows that when sowing any legume on

land where the same legume has never been grown before, or perhaps where it has not been successfully grown within recent years, we should always consider the matter of inoculation."

* * * * *

"There is abundant evidence that one of the dominant causes for the failure or unsatisfactory growth of some of our most valuable legumes, and on some soils the sole cause of failure, is the absence of the proper nitrogen-gathering bacteria."

As it has been proved beyond a doubt that inoculation pays large returns, often doubling yields, the problem now is to find the surest and most economical method. We believe that we are furnishing this in our INOCULATOR. This comes in two-pound cans, the bacteria being grown in soil, the element to which they must be returned.

We have enough confidence in the INOCULATOR to positively guarantee it to produce nodules, or tubercles, and will gladly replace any that does not prove entirely satisfactory.

In ordering please specify whether for Beans, Peas, Vetch, or, if for Clover, the variety.

Price \$1.00 per acre size can, postage paid.

We can also supply bacteria in bottles as heretofore. One dollar per acre size bottle.

A Few Points About Ordering

ORDER EARLY. We believe there is no need of urging our friends to order as early as possible this season for by this time everybody is acquainted with the transportation situation. It is sure to take longer to get seed this year than it usually does. More important still, there is never a time when it is not difficult to get pure seeds after the season is well along. It may pay some times to order by express. Please notice what we say under Freight or Express.

Order Blank. In sending orders we shall be glad to have you use our order sheet if convenient. It is also a very good plan to keep a copy of the order. When the shipping point is different from your mail address please give the county under each name.

Prepay Stations. If there is no agent at your station we must prepay the freight. If you don't know exactly what the freight will be, send more than enough money and we will return the difference. Thus you will be saved the trouble of extra correspondence and we will not have to send you a bill for the freight.

Freight or Express. We always ship by freight unless otherwise specified. However, one should keep in mind that express companies give low rates on seed, much less than on general merchandise. A small order can sometimes be sent as cheaply by express as by freight. To no place east of Marysville is the express on clover seed more than a dollar per bushel. As an example the average rate to New York and Pennsylvania is 75c; to West Virginia 55c; to Ohio 40c, somewhat according to the distance. Below we give a table of express as well as freight rates. Marysville is located in Union County, Ohio, thirty miles from Columbus on the C. C. C. & St. L. and the T. & O. C. Railways. Beans, peas and grains take the 4th class rate; seeds the 3rd class rate.

FIELD SEEDS LESS WEEDS

Freight and Express Rates from Marysville, O.

	Freight Class		Ex. Per 100 lbs.		Freight Class		Ex. Per 100 lbs.
	3rd	4th			3rd	4th	
Ohio				Connecticut			
Cambridge.....	21.	14.2	\$.68	Hartford.....	45.	33	\$ 1 62
Celina.....	21.	14.2	.57	Indiana			
Cincinnati.....	20.5	13.1	.68	Auburn.....	22.1	14.2	.75
Circleville.....	15.8	11.	.57	Evansville.....	29.5	20.5	1.13
Cleveland.....	21.	13.7	.68	La Fayette.....	23.5	15.	.75
Fremont.....	20.5	13.1	.57	Indianapolis.....	22.	14.	.87
Mansfield.....	17.9	12.6	.57	South Bend.....	25.	16.	.87
New Philadelphia.....	22.1	14.2	.68	Illinois			
Pomeroy.....	22.1	14.2	.68	Chicago.....	27.3	18.9	.94
Portsmouth.....	22.1	14.2	.94	Danville.....	26.3	17.9	.87
Toledo.....	20.	13.1	.57	Springfield.....	30.5	21.	1.13
Youngstown.....	23.	15.	.87	Michigan			
Zanesville.....	20.	13.	.75	Detroit.....	22.6	14.7	.75
Tennessee				Grand Rapids.....	27.3	18.9	.87
Knoxville.....	50.	45.	1.62	Jackson.....	24.2	16.3	.75
New York				Ludington.....	29.4	21.	1.20
Albany.....	38.5	26.	1.43	Maryland			
Buffalo.....	24.5	16.	1.13	Baltimore.....	39.	26.4	1.35
Canton.....	45.	30.	1.43	Dist. of Columbia			
Delhi.....	42.	29.4	1.35	Washington.....	37.	25.	1.35
Elmira.....	33.6	23.5	1.20	Delaware			
New York.....	40.	27.	1.50	Wilmington.....	40.	27.4	1.43
Rochester.....	24.2	20.2	1.20	Virginia			
Syracuse.....	33.6	23.5	1.28	Hampton.....	40.1	27.2	1.69
Pennsylvania				Charlottesville.....	36.	25.	1.35
Clearfield.....	39.	26.4	1.13	Richmond.....	36.	25.	1.62
Meadville.....	31.1	21.8	1.28	Roanoke.....	26.4	22.2	1.39
Philadelphia.....	38.	26.	1.43	Kentucky			
Pittsburg.....	22.5	15.	1.28	Hickman.....	35.	24.	1.39
Wellsboro.....	39.	26.4	.94	Lexington.....	27.	18.	.87
Wilkesbarre.....	38.	26.	1.35	Perryville.....			1.13
West Virginia				Williamsburg.....			1.32
Charleston.....	21.	14.	1.05	New Hampshire			
Clarksburg.....	25.5	17.	.94	Concord.....	45.	33.	1.73
Harrisville.....	26.	18.	.75	Vermont			
Huntington.....	23.1	15.8	.94	Montpelier.....	47.	33.4	1.62
Morgantown.....	33.6	23.5	1.05	Massachusetts			
Wheeling.....	22.	14.	.75	Boston.....	45.	33.	1.62
Maine				Rhode Island			
Portland.....	45.	33.	1.73	Providence.....	45.	33.	1.69

Parcel Post

SEED may be sent by parcel post according to the following table. In the first and second zone the weight limit is 50 pounds; in the others the weight limit is 20 pounds.

Zone	Zone Rates	1st lb. or Fraction	Additional lb. or Fraction
1st within 50 miles of Marysville.....		5c.	1c.
2nd within 50 to 150 miles of Marysville.....		5c.	1c.
3rd within 150 to 300 miles of Marysville.....		6c.	2c.
4th within 300 to 600 miles of Marysville.....		7c.	4c.
5th within 600 to 1,000 miles of Marysville.....		8c.	6c.
6th within 1,000 to 1,400 miles of Marysville.....		9c.	8c.
7th within 1,400 to 1,800 miles of Marysville.....		11c.	10c.
8th within 1,800 and over miles of Marysville.....		12c.	12c.

Change of Prices

FIELD seeds are sold on the basis of market quotations so it is impossible to guarantee prices. Sometimes the market may make a decided change in just a few days. If prices should be lower when you are ready to buy we should hate to lose your order because our prices were higher than a later quotation from some one else. Should they be higher we would have to charge accordingly, so please drop us a line for latest price-list, providing you are not ready to place an order soon after our samples arrive. But remember, if in a hurry send along the order and we will guarantee to satisfy you.

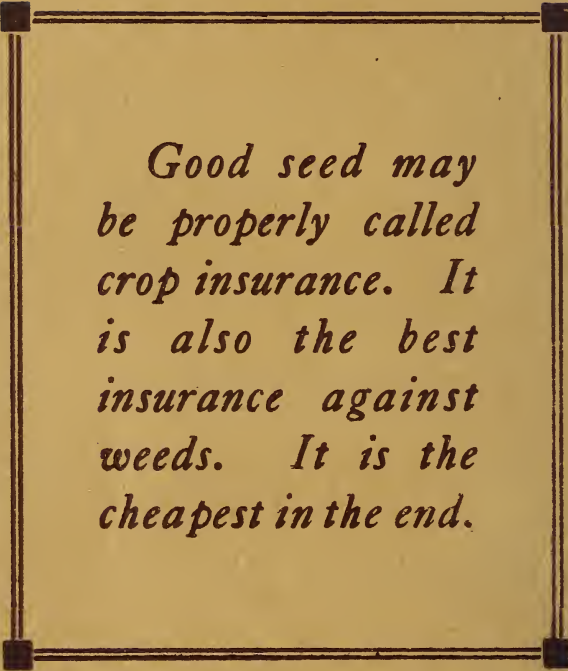
Small Lots. It is necessary to make an extra charge for very small lots but we appreciate receiving these orders just as much as the large ones.

Up To Sample We guarantee our seed always to be fully equal to sample but from time to time lots necessarily change.

Loss In Shipping. We guarantee shipments to arrive in good shape. If the bags are torn and some of the seed lost, just ask your agent to make a notation on the freight receipt showing the amount of shortage, send this receipt to us and we will send our check for the amount lost and make claim from this end of the line.

Bags Extra. It pays to ship only in the best bags. We sell them at cost so please do not be afraid to order plenty for you may return them and get your money back or send your own bags if you prefer. It is next to impossible to get three bushels in one bag. It would be much better if no bags contained more than two bushels for they are more easily handled by the railroad employees and much less likely to be carelessly handled and torn.

Terms. All our prices are quoted F. O. B. Marysville. We have to ask cash in advance otherwise we couldn't hope to continue this business at a profit, but if you haven't our price-list and are in a hurry for seed send along your order and we will ship by freight, draft attached, or by express C. O. D. We absolutely guarantee the seed and prices to be satisfactory.



*Good seed may
be properly called
crop insurance. It
is also the best
insurance against
weeds. It is the
cheapest in the end.*